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THE PRACTITIONER:

A JOURNAL

OF

THERAPEUTICS AND PUBLIC HEALTH.

EDITED BY

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THE PRACTITIONER.

JANUARY, 1885.

Original Communications.

COCAINE.

BY WALTER H. JESSOP, F.R.C.S.

COCAINE[1] or Cucaine, the local anæsthetic, which has during the last few months obtained so great a notoriety, is obtained from the leaves of a South American plant called Erythroxylon Coca. The properties of the leaves of this plant have given rise to descriptions as celestial as those of De Quincey on opium. Mantegazza says "God is unjust for having made man live without coca; I would prefer a life of ten years with coca to one of ten thousand centuries without."

The first account of its uses is from the writings of Tschudi[2] in 1838; he says that the natives of Chili and Peru commence the use of it when quite young, and continue it till old age, preferring hunger to loss of coca. An Indian servant, sixty-two years old, worked day and night for five days, with the exception of two hours sleep daily, at a difficult task, with no food except that procured by the chewing of coca. This statement is corroborated by the experience of all the earlier writers on this subject.

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[1] See *Practitioner*, xxxiv. p. 56.

[2] Tschudi, *Reiseskizzen aus Peru, in den Jahren* 1838-1842, t. vi. St. Gallen. 1846.

Dr. Unanne mentions that during the siege of Pez all the inhabitants died of hunger, except the few who possessed coca leaves, and they scarcely suffered.

The natives always mix with the leaves a small quantity of clipta, calling the mixture acullico. Clipta is the ash obtained by burning the dried twigs of various plants, and is supposed to act by liberating the active principle of the leaves, probably from the loose combination of cocaine with organic acids.

Moreno and Maiz [1] in their research on coca say that the long use of it produces impairment of digestion, emaciation, jaundiced look, uncertain gait, fixity of the eyes, pale lips, tremblings, foul breath, and that the patient becomes more and more apathetic, loses sleep and appetite, and finally succumbs to dropsy and general marasmus.

Notwithstanding the extraordinary properties ascribed by travellers to this plant, it was not till 1859 that the active principle cocaine was separated by Niemann.[2] Lossen [3] says the best manner to obtain cocaine is to digest the smallest leaves with distilled water at 60°—80° C.; the filtered solution is now precipitated with acetate of lead, the excess of lead is removed by sulphate of soda, the filtrate made weakly alkaline with soda, and shaken up with ether. To clear it, water is added, and sufficient quantity of hydrochloric acid, the solution is filtered, then precipitated with carbonate of soda, and crystallised out with hot alcohol. He obtained from the best leaves one-fifth per cent by this means.

Chemically it has been assigned the formulas, $C_{32}H_{20}NO_8$ and $C_{17}H_{21}NO_4$. It exists in very minute monoclinic prisms of a bitter taste. Lossen first showed that it required 704 parts of water to dissolve it. It is soluble in alcohol, chloroform, and ether.

The salts yet obtained are the hydrochlorate, acetate, citrate, and salicylate, of which the first has been the most extensively used. The dose of cocaine and its salts is $\frac{1}{32}$ — $1\frac{1}{2}$ grs.

The other substances obtained from the coca leaves consist of a volatile substance called hygrin, coca-tannin, ecgonine, and a wax.

---

[1] Moreno and Maiz, *Recherches sur l'Erythroxylum Coca.* Paris. 1868.

[2] Niemann, *Ueber eine neue organische Base in den Coca Blättern. Vierteljahrssch. für practische Pharmacie*, Bd. ix.

[3] *Ann. Chem. Pharm.* 133, § 351.

Physiologically, the best experiments published are the ones which were really the first systematically carried out, namely, those by Hughes Bennett,[1] in 1873, and for that reason I have mentioned his results fully. Their correctness has been substantiated by the exhaustive ones of Von Anrep[2] in 1880, though curiously he does not mention Bennett's thesis.

Schroff in 1862 mentioned in a lecture the property of cocaine in anæsthetising the mucous membrane of the tongue.

The chief conclusions drawn by Bennett[3] from his researches on cocaine and its allied alkaloids are the following:

"In small, not fatal, doses, they produce cerebral excitement, and partial anæsthesia; in large fatal doses complete anæsthesia; tetanic spasms, and death. They paralyse the entire posterior columns of the spinal cord, and the peripheral sensory nerves, but do not affect the motor tract. They first increase, then impede, and lastly stop the respirations. They at first increase, and finally diminish both the force and frequency of the heart's contractions. They produce at first contraction, and afterwards dilatation of the capillaries and small bloodvessels, with stasis of the blood, indicating first irritation and subsequently paralysis of the vaso-motor nerves." The other effects he mentions are myosis of the pupil, increased salivation, and tenesmus with a copious mucous discharge from the bowels; at the same time the temperature is at first slightly lowered and then increased.

Von Anrep's paper in 1880, referred to before, is the next one worth mentioning, recording as it does a large number of experiments ou both cold- and warm-blooded animals. He mentions mydriasis as a constant symptom in warm-blooded animals, after both local and general application of the drug. He also notices the local anæsthesia of the skin after a hypodermic injection, and the loss of sensibility and taste after painting a portion of his tongue with a solution of the drug. He found the daily quantity and specific gravity of the urine varied within normal limits, that sometimes albumen and sugar appeared, but only in animals which had suffered from long continued cramps and oppressed respiration.

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[1] "An Experimental Inquiry into the Physiological Actions of Theine, Caffeine, Cocaine," &c. (*Edin. Med. Journ.* vol. xix. p. 323).

[2] "Ueber die physiologische Wirkung des Cocaïn," von Dr. B. von Anrep (*Archiv für Phys. von Pflüger*, B. xxi. 1880, p. 38).

[3] *Op. cit.* pp. 325, 326.

Passing now from the literature of cocaine, we may inquire into the working of the drug medically and surgically. Our knowledge on the first heading is scanty. It has been given as a stomachic tonic, and from its action is surely likely to be a nervine tonic; the description of the excessive use of it graphically narrated above by Moreno and Maiz, would suggest its use in locomotor ataxia. But it is surgically that it has come so prominently before us lately, owing to the zeal of Dr. Karl Koller,[1] who has drawn attention to its local anæsthetic action. It has been applied locally to most of the mucous membranes of the body. Its chief effects in ophthalmic practice may be studied by a consideration of the following cases and results obtained by myself from clinical experience.

As to the operations that I have performed under this anæsthetic, their small number makes me diffident in entering at great length into them. The salt of cocaine used in my experiments and operations has been in all cases the hydrochlorate in 2, 4, and 20 per cent. solutions.

The operations are twenty-two in number, viz., two extractions for senile cataract, three needlings for soft cataract, three iridectomies (one for glaucoma), two tenotomies for squint, three Meibomian cysts, slitting up three canaliculi, opening periosteal abscess of orbit, five removals of foreign bodies from the cornea; to these may be added passage of probes down the nasal duct six times.

Starting with the extraction cases, the first was a feeble old woman with chronic emphysema. Two instillations of 4 per cent. solution of cocaine were administered at five minutes interval, the anæsthesia of the cornea was perfect, but on seizing the iris she winced and complained of great pain; no pain felt after snipping off the iris, the operation being quite successful. The second case was a man of seventy-nine, and the strength of cocaine used was 20 per cent. I gave him six instillations at five minutes interval, and tried by drying the conjunctiva and cornea, to apply the drops at the upper part of the cornea selected for operation. The result was most perfect; he experienced no pain, though I made a free iridectomy in order to let out a quantity of soft matter.

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[1] "On the Use of Cocaine for Producing Anæsthesia on the Eye," by Dr. Karl Koller (*Lancet*, December 6, 1884, p. 990).

The needle operations were painless, though all in small children. The iridectomies all experienced a certain amount of pain, especially the glaucoma case; this was probably due to the small amount of absorption into the anterior chamber due to the heightened tension, + 3, as the atrophied condition of the iris in such cases would surely tend to decrease the sensation.

The first squint was done after dropping the four per cent. solution on the lower lid twice. No pain was felt on cutting the conjunctiva or the capsule, but a good deal of pain on lifting the rectus.

In the second case, after two applications of the 4 per cent. solution to the conjunctiva, a few drops were injected by a syringe presumably into the internal rectus, and all the steps of the operation were painless. As to the Meibomian cysts, the first two were done by conjunctival instillation twice repeated, and pain was felt on clearing out the contents; in the third case an injection under the cyst was added and the patient complained of no pain. The periosteal abscess was treated by rubbing in three times a 4 per cent. chloroform solution, but with marked pain. In the operations on the canaliculi, the first two were on the same patient, and for excessively small puncta and a great deal of secretion in the sac. Two instillations of 4 per cent. solution were used to the conjunctiva, and with the fine point of a hypodermic syringe a drop was passed into the punctum; this was slit up and another injection passed along the canaliculus, though pain was not very great, yet the patient winced a good deal.

The second case was in a nervous boy of ten, and the notes are interesting as showing well the anæsthetic effect of the alkaloid. I dropped carefully on the inner canthus a drop of 20 per cent. solution, and then carefully inserted into the puncture a cannula fitted on to a small syringe Messrs. Arnold, of Smithfield, have carefully made for me; a few drops were thus injected into the canaliculus, and after a minute the cannula pushed on and again injected. I then withdrew the cannula and slit the canaliculus freely up, keeping well towards the conjunctival surface. A piece of mucous membrane was then snipped off, and a probe, No. 6, passed into the duct without any pain. Thinking perhaps the boy had little æsthesia, and as it is an operation rarely needing a general anæsthetic, I proceeded to slit the other canaliculus up without injecting cocaine, but he experienced so much pain that I finished the operation as in the first one under cocaine, waiting till the parts were dry.

In the foreign body cases, no pain was experienced, and in those for passage of lachrymal probes, the last two I have done after injection of the duct have been nearly painless, the slight pain experienced being probably due to tension from the size of the probe.

Looking at the results of these operations, and of others I have assisted at or watched, I should be inclined thoroughly to dry the part to be operated on, use, if possible, 20 per cent. solution, apply it as nearly as possible over the part, and if for the deeper structures, such as the iris, apply it five or six times at five minutes' interval. In iridectomy for glaucoma I think it will be useless unless one can inject the anterior chamber, and for this purpose Messrs. Arnold have constructed, at my suggestion, a small steel bent cutting needle; the stem being bored, this can be fitted on a syringe handle, and thus the solution can be injected into the anterior chamber. If deeper structures than the skin or mucous membrane are to be cut, I should advise exciting superficial local anæsthesia first, and then hypodermic or subfacial injection of the part.

I have practised it on myself, and have produced local anæsthesia of the subcutaneous and deeper structures. The places I have tried have been the eyelid and twice in the thigh; in the former the complete anæsthesia spread more than usual owing probably to the loose subcutaneous tissue; in the latter the anæsthesia was very limited when I injected two minims of 2 per cent. solution, but was considerably greater on injecting ten minims. In the last case I intentionally pierced the muscle, which, on sensation returning, was seized with limited cramping pains. These lasted till the next day, so I shall not care to repeat this experiment.

A word of caution may be addressed in cases of foreign body.

namely, that it increases the difficulty in extraction owing to the flaccidity of the cornea, and a great abrasion of cornea may be produced if care be not taken.

In the above-mentioned operation cases the earliest in each series were always done with 4 per cent., as only during the last three weeks have I been using 20 per cent. In none of the cases was any after trouble experienced at the site of the wound, owing to the anæsthesia produced; and my last case of cataract, in which I used more than ever I had done before, has made a most perfect recovery, the wound healing in seven days, notwithstanding the patient's great age.

In several cases I have tested its efficacy in corneal ulcers with extreme photophobia, and have found it of great use in getting a child spontaneously to open its eyes, instead of as before going through the stage of struggling with it, and in the end scarcely being rewarded by a sight of the cornea, frightening the child, and alarming the mother.

As to its value in refraction the following case will best tell:—

Dr. R. J., æt. 30, consulted me about his eyes, as his sight was getting gradually worse; he had worn spectacles + 2D for some years for hypermetropia.

His pupils were so small that I could not satisfactorily estimate his refraction either by the direct method or retinoscopy, and added to this he was amblyopic in the right eye, so that I could not use homatropin. Acquiescing readily in my suggestion of cocaine, I put one drop of the 20 per cent. solution in his left eye. In ten minutes the pupil increased from two mm. to five mm. and his near and far points met; eighteen minutes after this his pupil was 8·5 mm., and his accommodation was completely paralysed. With the greatest ease I estimated his hypermetropic astigmatism, and in another case should directly order glasses, but I was not then quite certain as to the working of the drug.

He told me the next day that the paralysis of accommodation disappeared one hour after it attained its maximum, and the pupil was fully contracted twelve hours after.

Mr. Butlin informs me that he has been using a 20 per cent. solution of cocaine for some weeks in his extensive throat department at St. Bartholomew's Hospital, and has been much pleased with its local action. He mentions especially one case of papilloma of the larynx, in which he had the greatest difficulty even in seeing the tumour before. After twice painting the mucous membrane of the larynx with the solution at four minutes' interval, he was enabled to see the application of the forceps to the tumour on the vocal cord, and easily to remove it. His own experiences on the inferior turbinated bone are recorded in the *Lancet* of November 29, 1884.

An interesting case of cocaine poisoning is mentioned by Ploss[1]:—

An apothecary intending to commit suicide extracted twenty-four grammes of a crystallised substance from two pounds of coca leaves and administered it to himself in a glass of beer, afterwards taking two small glasses of brandy. For a time he felt quite well, and soon went to sleep but woke up with gripings of the stomach, burning pains in the palate, dryness of the mouth and throat, dizziness, great weakness of the whole body, perfect consciousness, pulse and temperature normal. After taking $1\frac{1}{4}$ gr. of morphia he fell asleep and woke up quite well, though he did not pass urine for twenty-four hours.

The physiological effects I have noticed in my experiments were in most instances tried first on myself and some medical friends, and I think the best way to bring them forward will be to start with my first results, then give illustrations of each phase, and finally discuss the meaning of the effects.

My first experiment on myself was rough, being merely to induce anæsthesia, the other effects on the eye not being correctly noted.

Of the second I have the following notes:—

V.	R. $\frac{6}{6}$: J. 1 at 22 cm.		Ref. emmetropic.
	L. $\frac{6}{6}$: J. 1 at 22 cm.		Pupils 4 mm. and equal.
11.38 A.M.	Cocaine 4 per cent. solution into left eye.		
11 43 ,,	Cocaine.		
11.48 ,,	Cocaine.		Pupil 4·5 mm. V. same.
12 M.	Cocaine.		Pupil 5 mm. V. same.
12.10 P.M.	Cocaine.		Pupil 7·5 mm.
12.15 ,,	Cocaine.		Pupil 7·5 mm. J. 4 at 22 cm.
12.25 ,,			Pupil 7·5 mm. J. 12 at 22 cm. + 4 D J. 1 at 22 cm.

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[1] Varge's *Zeitschr.* v. f 11 5 p. 222, 1863.

The loss of accommodation lasted three-quarters of an hour.

The points noted were:—

1. Dilatation of pupils though acting to light, and to the movements of accommodation.
2. Complete anæsthesia of cornea and conjunctiva in fifteen minutes, the anæsthesia limited to the conjunctival margin of the lids, any traction on the lashes giving rise to pain.
3. Sensation of heaviness and coldness of eye-ball.
4. Slight lachrymation.
5. Paralysis of accommodation.
6. Enlargement of palpebral fissure.
7. Constriction of small peripheral vessels.

After this I tried the solution for cases of refraction and noted the following extra points:—

That the enlargement of the palpebral fissure was due to drawing up of the upper lid, and at the same time to depression of the lower lid, the parts affected in the lower lid being the outer part, and an increase in the distance from the inner canthus to the punctum, the latter being turned in. On finding this out, I put my left eye well under the influence of a 4 per cent. solution, and went to Dr. Steavenson at the electrical department of St. Bartholomew's Hospital. He very kindly took great interest and faradised carefully my orbicularis with the effect that on the cocainised side the reaction was distinctly increased.

The only other general case (though possessing careful notes of about 100) I need take, is the effect of the 20 per cent. solution on myself.

December 15.—Dr. Steavenson found the faradic contractility of the orbicularis on both sides was the same.

2.10 P.M. 1 gtt. coc. 20 p.c. in left eye, p. 5 mm. p. r. 88 cm. p.p. 16 cm.

2.17 P.M. p. 5 mm., p. r. 88 cm. p. p. 16 cm., enlargement of palpebral fissure very marked, anæsthesia, cold feeling, slight lachrymation, slight fibrillar contraction of orbicularis.

2.27 P.M. p. 7·5 mm. p. r. 68 cm. p. p. 27·5 cm. complete anæsthesia.

2.37 P.M. 1 gtt. coc. 20 p.c.

2.53 P.M. p. 7·5 mm. p. r. 55 cm. pp. 30·5 cm.

3.40 P.M. accommodation just recovered; the pupil continued dilated slightly till 9 o'clock the next morning.

I went round to Dr. Steavenson at 2.55 P.M., and found the same increased action of the left orbicularis palpebrarum.

With regard to any pushing forward of the eye opinions were so varied, that I decided there was none.

As to the amount of accommodation lost in myopes and hypermetropes, I have not yet had time to estimate, or make up my notes, but with 20 per cent. solution twice repeated carefully the amount of accommodation lost is about 3D, lasting about three-quarters of an hour, and slowly returning. My notes also would suggest that the accommodation does not fail much till the pupil is widely dilated.

The dilatation of the pupil takes place as soon as absorption has commenced, and in strong solutions begins after retraction of the lids.

The pupil always acts to light, and to the movements of accommodation, but the more dilated it is, the less the action.

If the cocaine is dropped on carefully and locally, the pupil dilates first near the point of contact, hence one often has an irregular pupil before complete dilatation.

The cocainised pupil can be made to assume any shape by pressure on the sclerotic or cornea. The cornea becomes quite flaccid, and the anterior part of the eye loses its tension, but this cannot be made out for the vitreous, and I think there is slightly increased tension posteriorly.

The palpebral and ocular conjunctivæ are at first whiter, and more bloodless, but this does not always last.

The slight lachrymation is due to the altered position of the punctum.

I have carefully noted the fields of vision for white, red and green, the colour vision, and retinal circulation, without finding any change. These have been done, both in bright daylight and also in a dim light.

Looking at all these different points, the anæsthesia of the conjunctiva and cornea is easily explained by a local action on the sensory nerves extremely limited, but becoming more diffused here owing to the movements of the lids.

The other important symptoms are therefore:

1. Dilatation of pupils, acting to light and movements of accommodation.
2. Constriction of small peripheral vessels.
3. Paralysis of accommodation.
4. Enlargement of palpebral fissure.

The first three, of course, may depend on irritation of the sympathetic; and Mr. Nettleship advanced this theory at the last meeting of the Ophthalmological Society, adding that the fourth may be due to constriction of the arterioles supplying the ciliary muscle, hence bloodlessness of the muscle.

Before accepting the sympathetic origin of the four symptoms before enumerated, I will recount the experiments and results I have obtained.

The first were made with a view to find out the cause of the dilatation of the pupil, namely, whether it was due to paresis of the third nerve or irritation of the sympathetic.

To test the pupil the drugs used were atropin and homatropin, being mydriatics, and paralysing the accommodation, acting chiefly through the third nerve; eserin and pilocarpin causing myosis and spasm of accommodation, the former by direct stimulation of the muscular fibres of the iris, and the latter by stimulating the endings of the third nerve in the iris.

Full atropin mydriasis became increased by a 20 per cent. solution of cocaine, the increase not acting to light or the movements of accommodation; the same was true for homatropin.

A fully cocainised pupil also dilated by atropin, becomes fixed, and the paralysis of accommodation is increased.

Eserin constricts a fully cocainised pupil.

Cocaine does not dilate a fully eserinised pupil.

Pilocarpin will not constrict a fully cocainised pupil, but will a moderately dilated one.

Cocaine will not dilate a pupil fully under pilocarpin.

These conclusions, added to the fact that the cocainised pupil always acted to light and the movements of accommodation, left little doubt that it was due to sympathetic irritation.

As to the enlargement of the palpebral fissure it might be either irritation of the unstriped fibres of Müller in both lids or palsy of the ciliary portion of the orbicularis. I tried hard to explain the increased faradic reaction of my orbicularis when the eye was under cocaine, and came to the conclusion it might be irritation spreading along the muscular fibres due to the drug, or increased action of the muscle due to palsy of part of it weighting the rest of the muscle, or its pulling against increased action of another muscle. I went round to the electrical department and looked at the cases of facial palsy, seeing that the part of the lower lid everted was generally towards the inner side and the punctum everted, whereas in mine the dropping was outwards, and the punctum drawn inwards. Luckily I thought of trying cocaine on a thoroughly palsied and everted lower lid with the gratifying result that the eversion considerably diminished, and the punctum tried its best to invert. This I think proved my point; the upper lid, of course, would be difficult to prove alone, as if the upper fibres of the orbicularis are paralysed it is drawn up exactly in a similar manner by the levator palpebræ.

The retraction, therefore, of the lids is due to contraction of Müller's muscle and is the reason for the increased action of the orbicularis when faradised.

The constriction of the small peripheral vessels is easily accounted for by irritation, but this constriction only affects the very superficial ones, and is often misleading owing to the drug not being applied directly.

As to the paralysis of accommodation, I cannot imagine the possibility of Mr. Nettleship's ingenious theory. Even on the superficial vessels the action is so slight that one cannot understand how it could make such an effect on the deeper ones of the ciliary body as to render it practically bloodless, without also affecting the retina. The loss of accommodation also lasts some considerable time.

Thus, looking at the symptoms of the action of cocaine on the eye, we have them all, except one, cleared up satisfactorily by imagining the effect of the drug is local and acts by paralysing the peripheral endings of the sensory nerves, and irritating the sympathetic nerves.

In another paper I shall hope to explain that the palsy of accommodation is also due to irritation of the sympathetic, though not by its action on the blood vessels of the ciliary muscle.

DIPHTHERIA.

BY C. J. RENSHAW, M.D.

As the readers of the Practitioner are aware, diphtheria is one of the diseases which, at the present time, is exercising the attention of the Collective Investigation Committee of the British Medical Association, and about which much knowledge, through its aid, has already been obtained. There, however, remains much to be learned, and I hope we shall be able, either to add some new information to the literature of diphtheria, or to prove the truth of some of the older hypotheses.

In the following pages I have taken, perhaps, more from the apparent facts obtained through the Investigation Committee, and from my own personal experience, made during the past few years, and in the late epidemic in my neighbourhood, Ashton-on-Mersey and Sale, during which period my field of observation extended over 126 cases, than from the many excellent monographs written upon the subject of diphtheria. There is, I presume, no question as to the definition of diphtheria, according to Aitkin, "a specific contagious disease with membraneous exudation on a mucous surface, generally of the mouth, fauces, or air passages, or occasionally on a wound." The word contagious, I have inserted; later on I think I shall be able to prove its necessity. Now, I find that out of thirty cases of which I took special note, the incubation of this disease varied from fifty hours in my most severe case, to fourteen days in the slightest, and I found the rule to be, that the longer the disease was in showing itself, after the probable time of infection, the less serious was the attack of diphtheria. The cases were ushered in by a shiver, slight in mild cases, severe in the more dangerous ones; then a rise in temperature and in pulsation; in a few hours sore throat appeared, and still later, or about thirty hours from the shiver, membrane would exude, first, generally upon the tonsil and uvula, then the back of the pharynx, over the roof of the mouth, and on the mucous membrane lining the cheeks. The prostration in bad cases was severe; the pulse varying from 140 to 160, and the temperature from 102° to 106°, and in one case, 108°. Albumen was detected on the second day from the exudation of membrane, a great distinction between this disease and scarlet fever, in which, as you are aware, it rarely is found till the stage of convalescence or exfoliation has set in.

In nearly all the cases there was enlargement of the glands at the angle of the jaw and the lymphatics in connexion therewith, which showed early or late according to the severity or the reverse of the case. Occasionally, too, there was a discharge from the nose, which caused much trouble and was very offensive, a symptom I learned to look upon with considerable misgiving; there was always great prostration with it.

If the cases terminated in recovery, many days had to be passed over before the patient was free from the danger of paralysis. The paralysis seemed generally to attack the muscles of deglutition first, then of the eyes, then passing downwards slowly, till, in several cases, I think every muscle had in turn been paralysed. Recovery from the paralysis always took place, as far as I know. According to the information obtained by the Investigation Committee, the number of cases attacked by the paralysis after diphtheria is 25 per cent.

I will now relate the two most serious cases that came under my care.

Mrs. M——, 33 years of age, well made and healthy, mother of seven children, suckling the youngest, commenced to shiver on November 1st, at bed time; on November 3rd, she complained of stiffness of the lower jaw and sore throat. On examination I found pulse 130, temperature 102°, tonsils swollen, deglutition difficult, breathing 28 to the minute; eight hours later, the diphtheritic exudation showed itself on each tonsil, and twenty-four hours later, or on the beginning of the fourth day from the shiver, ninety-six hours from the probable time of contagion, the whole of the back part of the mouth was covered with diphtheritic membrane, the pulse was 160, temperature 106°. The membrane increased so much in thickness that there was danger of suffocation, simply by mechanical means, and the effluvium was most offensive. Under treatment, which I will as shortly as possible describe, the patient recovered after a severe struggle of four weeks. I commenced at the outset of the disease with free stimulation, six ounces of brandy and as much champagne as possible in the twenty-four hours, beef tea made with barley water in place of ordinary water, turtle and ox-tail soup, &c. The tonsils and other parts affected with diphtherite were freely painted with a saturated solution of permanganate of potassium, the membrane was removed morning and evening for eight days, and quinine was given till the temperature was reduced to 101°, and then combined with tincture of the perchloride of iron. The albumen showed itself the second day of the diphtheritic membrane appearing, and, although much relieved, is still there, three years since the attack. At the end of six weeks we had to combat the paralysis, which first attacked the eyes, causing internal strabismus, then the nerves of hearing, then of smell, then of the throat, chest, arms, and legs. The treatment of this was the internal administration of strychnine and the external use of electricity by the constant current. The recovery was perfect.

L. M., female, twenty-three years of age, fairly healthy, had a severe rigor on June 24th at night; on June 27th the membrane showed itself on the fauces and rapidly spread, covering the mouth, and I think passing down the trachæa and œsophagus, as shown by the difficulty of breathing and swallowing. On June 30th there was double pneumonia, the abdomen was tympanitic, the mucous membrane of rectum was found to be covered with diphtheritic membrane, as were also the vagina and lower parts of the uterus. The following day she died. I was unable to remove the diphtherite from the mouth, not being able to get the mouth sufficiently open. I ordered a nourishing and stimulating method of treatment, but my recommendations I heard afterwards were but imperfectly followed out.

Perhaps it would not be out of place here to mention the result of some experiments I made some years ago with diphtherite on animals. I gave some membrane of a greyish white colour I had removed from a patient to several cats; I gave one portion to two cats; the smaller of the two began to be ill on June 6th, 1874, the third day, and died on the seventh day; on examining the animal after death, I found patches of diphtheritic membrane on the mouth, fauces, and lining of the bronchial tubes, also on parts of the bowels. The small amount of urine I was able to collect from the bladder was highly albuminous, the kidney was of whitish colour. The second cat lived to the thirteenth day, having begun to be ill on the fourth, and suffered from a severe attack of the disease, the post mortem showing the diphtherite lining the whole mucous tract, partly in patches, from the mouth to the anus; the urine was albuminous, the kidney similar to what one meets with after death from scarlatinal dropsy.

One experiment was the introduction of some of the membrane into the axilla of a cat by means of a wound; the animal began at once to be ill, and in three days there was membrane on the fauces and the back of the throat. The attack of the disease was slight, recovery soon taking place.

Nine experiments consisted in the administration of diphtherite from the same patient as the previous case, previously placed in a saturated solution of permanganate of potassium; these produced no effect upon the animals, neither did six pieces of the membrane similarly dealt with, placed in the wounds of cats; diphtheritic membrane placed in a saturated solution of hypochlorous acid gave a negative result with a dog, as did also several experiments on mice with the same material.

These cases point decidedly to the conclusion that diphtheria is eminently contagious, and also to the possible antidote in the early application of a strong solution of permanganate of potassium or hypochlorous acid. I made some experiments with the membrane of membraneous croup, by administration to animals, but I was unable to find any effect; thereby, I think, clearly proving the difference between the two diseases.

Some Experiments made on Animals with Diphtheritic Membrane.

June 1,	1874.	—Administered membrane of diphtheria to one cat .	Result, negative.
,, 3,	,,	—To two mice	,,
,, 5,	,,	—To a rat	,,
July 2,	,,	—To a cat	,,
,, 2,	,,	—To a cat	,,
Aug. 7,	,,	—To a cat	,,
,, 21,	,,	—To a cat	,,
Sept. 3,	,,	—To three mice	,,
,, 3,	,,	—To one hen	,,
,, 7,	,,	—To one hen	,,
,, 18,	,,	—To one hen	,,

This membrane was of a yellowish white appearance. All the cases from which the membrane was taken had enlargement of the lymphatic glands at the angle of the jaw, and three of the cases suffered afterwards from paralysis. Five cases had albuminuria, commencing on the second, third, fifth, and ninth days respectively. There was no doubt as to the membrane being that of diphtheria.

June 6, 1874.—Having seen that the stomach and bowels of a cat were emptied, I administered some diphtherite of a whitish grey colour, taken from the throat of a living patient.

June 6.—Administered to a cat. Result, death from diphtheria on seventh day.

June 6.—Second cat. Result, death from diphtheria in twelve days.

June 8.—To a cat, death occurring on ninth day.

June 9.—To two mice. Death occurred on tenth and thirteenth days.

June 10, 11, 12, 13, 14, and 15.—I saturated some membrane taken from the same case with a solution of permanganate of potassium; this gave negative results on administration to animals, in nine cases. I also got negative results from saturating the diphtheritic membrane with hypochlorous acid, and using it for a like purpose.

June 12.—Placed a piece of membrane in a wound of a cat, and got well-marked diphtheria in three days. The animal recovered.

The fourteen experiments on animals with the yellowish white membrane were all failures. The six experiments on similar animals, made with greyish white membrane, were successful. All experiments on graminivorous animals were also unsuccessful.

It is by these experiments proved that diphtheria may be communicated from man to animals. Is not the converse just as probable; may not some of those mysterious attacks of diphtheria, which we all come across in practice, be conveyed by a favourite cat or dog to the patients?

And does it not suggest to us, in all times of epidemic, the advisability of our preventing, as far as possible, that habit of fondling our domestic animals, which is so common amongst us?

Is diphtheria a sewer disease? If not, how does it arise? I see in the deductions drawn by Mr. Shirley Murphy from the papers of the Collective Investigation Society upon that disease, that less than one-tenth of the number of cases is supposed to arise from sewers or bad drainage. I at first thought the disease was met with chiefly in new houses and new drainage areas. I find it is equally to be found in old as in new houses, well drained and otherwise, in houses in which there is no connexion with drains, and in localities where there are no drains at all. It is, therefore, evidently not a sewer disease, *per se*, although it is, no doubt, possible for it to be carried by drains, and, undoubtedly, badly ventilated drains emitting noxious gases into the house of the patient make it a much more dangerous disease to treat. The disease is epidemic and sporadic, and, as far as I can make out, does not follow any particular line of drainage.

There is no doubt it is contagious from person to person. I have evidence where one sister called to see another, who was not well, suffering from sore throat. She kissed her. This lady began to shiver three days afterwards, and this was the commencement of a severe attack of diphtheria, although the sister who was kissed did not show the diphtheritic membrane till the day after she was kissed. The visitor who kissed the poorly one only remained in the house a few minutes, so that probably the kiss was the cause of the contagion.

I have another case, where one child with a slightly sore throat bit another upon the lip. The child bitten suffered from diphtheria, which commenced in the wound and then in the throat, the disease beginning on the seventh day after being bitten, the child that bit the other only developing diphtherite two days after the operation. This again shows, I think, distinctly, the contagiousness of the disease, and that it may be communicated before the appearance of diphtherite. In my own neighbourhood, well drained, with the sewers well ventilated, the cause of the epidemic is yet in doubt: but what seemed to me a matter to be noticed was this, that during the height of the epidemic there was a peculiar sickly smell at the time of the morning when, as a rule, the atmosphere is most fresh and pleasant, that is from 1 to 5 A.M., that I did not perceive after the epidemic had subsided. Another was that a quantity of stinking nightsoil from Manchester, constantly being delivered, loaded the atmosphere with odours diabolical. The place of its delivery was changed after a time, through the determined efforts of Dr. Burghardt, and the disease seemed to subside directly afterwards; but, singular to state, if this were in any way the cause of diphtheria (I should ask whether its gases were not more a carrying agency), neither the men who carted the manure away, nor the inhabitants close to the refuse, seemed to suffer from that disease.

The following facts point to the disease being a ferment (according to Dr. Ransome), neither of decaying vegetation nor animal decomposition alone, but to a mixture of both. In the great epidemics of France (1818-1855) and Scotland, it is on record that the places were in an unsanitary state, all sorts of material, mixed and unmixed, animal and vegetable, being left about to decay and taint the air.

Case 1. A heap of vegetable matter, on October 1st, was mixed with a quantity of animal matter by two men; both heaps had been on the ground for some months. Neither of the men were taken ill. This mixed heap was distributed over a field on March 1st. One of the men who distributed it, and a boy who assisted him, were taken ill of diphtheria, one on March 3rd, the other on the 7th.

2. A similar heap, similarly treated, was spread on a field

adjoining a house in which there were children; the two men who carted the material on to the field, as also the five children, were all ill of the disease within fourteen days.

3. A heap of ordure, close to a house, having been there for a considerable time, was mixed with some vegetable *débris;* no one was ill then, but three months afterwards, it being opened and used for the garden, four children residing in the house were seized with diphtheria.

4. Two children were playing on a heap of animal and vegetable manure, just opened; four days afterwards the first child was taken with diphtheria, and two days later the second child fell ill with the same malady.

5. Some strong mixture of blood and vegetable matter was spread on a rose bed; a little child watched the process, was sick at night, four days afterwards was suffering from diphtheria; there was no other case in the neighbourhood, and the child had not been out of its own garden.

I could give you more instances, but I think I have said enough to show that I have not made assertions without proof. We do not seem to have much diphtheria in those immense slaughtering places, in Europe, or South America, where, if anywhere, we might expect to have that disease if it arose simply from decaying animal matter; nor yet from the heaps of decaying vegetation left in the neighbourhoods of our markets, such as Covent Garden, if vegetation in its resolution were the cause of the disease.

Now, is this only an accident? Are these various decompositions only waiting the favourable moment to become hotbeds for the propagation of diphtheria, of themselves; or do not rather the cases I have quoted point at the probable necessity of the cause being more of the duality of the poisons of animal and vegetable decomposition?

Now as to treatment. The best plan seems to me, as in other diseases, to see that your patient be placed in a well-ventilated room or tent; fill the room with some disinfecting material, in a gaseous form, not disagreeable to the patient; have an even temperature of about 60°; give, where possible, 2,000 cubic feet of air; let your patient be constantly watched, for in no case can it be more truthfully said, you know not what an hour may bring forth. If the temperature of your patient be high, stimulate freely and nourish constantly; if the pulse be quick or irregular, or if there be too great lowness of the pulse, such as shock might produce, stimulate freely. Quinine is better to be given, I think, in high temperatures than iron. The membrane should be freely painted with a saturated solution of permanganate of potassium, and a strong gargle of hypochlorous acid frequently used. If the membrane easily remove, let it be taken away as soon as possible, for it neither becomes organised nor does the mucous membrane heal underneath it, and the effluvium from it is often so offensive that it may well turn the scale against life, where that is only held by a hair, like the sword of Damocles; besides, there is considerable danger from mechanical suffocation, for the parchment-like membrane becomes thicker and thicker, and so may cause considerable, if not fatal, impediment to breathing. I would remove it, were it possible, if only to see what is going on below, and so save, I believe, those ulcers so difficult to cure, and that fearful sloughing which we occasionally come across when the membrane is left to itself. The treatment of the albuminuria is best conducted by hot applications to the region of the kidneys, the after paralysis by the internal administration of strychnine, and the external use of galvanism applied to the neighbourhood of the muscles that are in want of nerve force. Then there is no doubt much may be done to prevent the disease affecting other members of the family by the patient and nurse being entirely isolated; nor must the sheet over the door saturated with disinfectant be forgotten, and the patients' discharges being received into vessels containing disinfectants, and their clothes similarly treated. It is a well known fact that scarlet fever and diphtheria may affect the patient at the same time, and Dr. Ransome, in his excellent pamphlet on the *Relations between Diphtheria and Scarlatina*, suggests a strong connexion between the two diseases, and throws out the idea that the difference lies in the difference of ferments; this is a valuable suggestion, which leaves large scope for enquiry and experiment.

It is not, as you are aware, an uncommon occurrence for a patient, suffering either from scarlet fever or from diphtheria, to be seized with epistaxis. I was able to try the effect of injecting the liquor sanguinis from both cases into animals. That from scarlet fever injected into the areolar tissue of a rabbit caused slight illness on the second day, sore throat on the fourth, and whitish tongue on the fifth, sixth, and seventh, with recovery on the tenth. The liquor sanguinis from a case of diphtheria caused death in a rabbit similarly treated seventeen hours afterwards from congestion of the lungs, and in a frog awakened from its hibernation in twenty-four hours.

It would seem to me from the above-named experiments that diphtheria is different from membranous croup; that it is different from scarlet fever; that it is a disease of itself, of a highly dangerous character, but that science has great power over it as to prevention and treatment. That it is conveyed by contagion, and may also arise *de novo*, from, I believe, a mixture of animal and vegetable matter in decomposition under certain circumstances; but that there is little, if any, evidence, to show that it is caused by sewage simply, or animal or vegetable decomposition by themselves.

ON THE CHEMICAL PRODUCTS OF PUTREFACTION IN THEIR RELATION TO DISINFECTION.[1]

BY PROFESSOR BURDON SANDERSON, F.R.S.

By the term putrefaction is understood the process of fermentation which aqueous liquids containing proteid material in suspension or solution undergo in presence of living bacteria at a suitable temperature.

According to the doctrine set forth by Pasteur in 1862, and now very generally accepted by biologists and chemists, putrefaction, in common with other fermentative processes, is identified with the life of the organisms which observation shows to be its constant concomitants. As a result of this theory the study of these processes has tended of late to become more and more biological. It is, moreover, evident that, whether the theory above referred to expresses the whole truth or only part of it, the process remains as it was before, a chemical one; for whether we consider the changes which bacteria produce in the substance on which they grow, or the conditions upon which they themselves depend for their existence, these are alike chemical. Thus, bacterial life is a middle term between chemical antecedents and consequents.

In consequence of the imperfection of our knowledge of the structure of the proteid compounds, that is, of the material which affords septic bacteria their soil, the chemical investigation of the process is of extreme difficulty. Some light is thrown on its nature by the better knowledge we possess of processes evidently analogous to it, to which bodies of known constitution are liable under corresponding conditions. Among the best examples of these, the decomposition of calcium formate and acetate under the influence of septic ferment may be referred to (the former yielding CO_2 and H, the latter CO_2 and CH_4), or the decomposition of lactic acid (yielding butyric acid and hydrogen), the most remarkable feature being the prevalence in the liquids undergoing decomposition of strong reducing agents.

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[1] Reprinted from the *Supplement to the Thirteenth Annual Report of the Local Government Board*, with some alterations by the author.

In general the putrefaction of proteid begins by the transformation of the proteid material itself, first, into albuminates, *i.e.* bodies soluble either in liquids of acid or alkaline reaction but precipitated by neutralisation; second, into peptones, by which term is meant a proteid body which is soluble in all aqueous liquids, acid, alkaline, or neutral, and at all temperatures. The second stage in putrefaction consists in the breaking up of these soluble proteids so as to give rise to compounds more simple and definite in composition, of which the most important are the well-known substances, leucin, tyrosin, and indol. Indol, and tyrosin with its derivatives belong to the aromatic group, and may be chemically characterised as derivatives of a common nucleus of six atoms of C, each of which has a free affinity. With reference to the present inquiry, the group possesses this remarkable interest, that the members of it are linked together, not only by their chemical structure and relations, but also by the physiological property, which, so far as we know, is possessed by all of them in greater or less degree, that of antagonism to the life of ferment organisms (microzymes).

Inasmuch as in the septic process the initial material is proteid and the end products are ammonia and CO_2, there is an obvious resemblance between it and that of the exchange of material in the animal body, the difference being in the intermediate stages; but even here the analogy holds good in certain important respects. It is alike characteristic of both that organic acids belonging to the acetic series (*i.e.* having the constitution $H\ (CH_2)_n\ COOH$) are produced in such quantity as to represent a large proportion of the initial material. In the metabolism of the higher animals these occur as glycerides of the higher fatty acids, in the bacterial process in the form of compounds of acids of the same series in the constitution in which n has a lower value with the alkali metals or ammonium. The analogy which has just been referred to derives its importance from the consideration that in the production of all infective diseases, from inflammation to the specific infections, the two processes are concomitant and at the same time antagonistic. Whatever hope we may entertain of eventually acquiring a complete understanding of the nature of this antagonism must be founded on the knowledge which we now possess, or may in future possess, of the relations between the two processes, *i.e.* of the influences which they mutually exercise on each other in the living organism of man and the higher animals.

From this very general statement it is obvious that bacterial life regarded from a chemical point of view, that is to say, with reference to the question of the initial material (proteid) and the end products (CO_2, water, and NH_3), corresponds closely with that of animal life in general. For while bacteria feed on proteid and convert its material into the simple forms above enumerated, the higher animal organisms in their processes of digestion and assimilation arrive eventually at the same result. The difference lies chiefly in the intermediate stages; in both, bodies belonging to the acetic acid series are produced in such quantity as to represent a large proportion of the initial material; in the first the bodies include the lower members of the fatty acid groups, whilst in the second the higher members appear as glycerides or fats.

The mode in which the presence of septic organisms in the living tissues of man and animals can be best understood is by recognising the essential correspondence which exists between their vital processes. It is because the vital processes of the bacterium so closely resemble those of the animal with which it associates itself that the one comes into such relation with the other as to exercise a modifying (that is to say, a disease-producing) influence upon it. Whatever the nature of its influence may be, it is obviously chemical.

The aromatic compounds as products and concomitants of bacterial life, will be conveniently considered in the four following sections:—

§ I.—*Phenol or Carbolic Acid as a Product of Sepsis.*

When in 1876 Professor Salkowski[1] was engaged in investigating the condition of the urine in several cases of ileus with reference to the occurrence in the urine of persons suffering from this pathological condition of one of the normal constituents of the secretion, the indigo-producing substance, in large excess, he made another important discovery. In treating the urine for the purpose of preparing this body, which from its supposed identity with the indican of the indigo plant received the same name, he "observed a peculiar smell which reminded him of chloride of phenyl;" on distilling a quantity of urine after making it acid with hydrochloric acid, the destillate gave an abundant precipitate of tribromphenol with bromine water amounting to ·04 grammes in 200 cc. In a second case of ileus in which the destillate was extracted with ether, the ether extract on evaporation left a residue which gave an intensely blue colour with ferric chloride, the bromine precipitate amounting in this case to ·20 grammes. In successive days similarly large quantities were obtained, the largest being ·3. The urine throughout was very rich in indican. It was further found in these cases that the relation between the inorganic and organic sulphates, which Baumann's previous researches[2] had shown to be 1 to 1·2 in human urine, had increased to 1 to 1·35. The connexion between these facts, which was at the time not understood, will be explained further on.

It had been previously shown by Hoppe-Seyler[3] that in the urine of the horse, when distilled after acidulating with hydrochloric or sulphuric acid, the presence of phenol can always be shown in the destillate.[4]

It was also found in human urine and in that of the dog, but from the smallness of the quantities obtained, it was concluded that it was probably chiefly derived from the constituents of vegetable food.

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[1] E. Salkowski. Ueber das Vorkommen phenolbildender Substanz im Harn. Centralblatt für med. Wiss., 1876, p. 818.

[2] E. Baumann. Ueber gepaarte Schwefelsäure im Harn. 1876. Pflüger's Archiv, vol. xii. p. 69.

[3] Hoppe-Seyler. Ueber das Vorkommen von Phenol im thierischen Körper, &c. Pflüger's Archiv, vol. v. p. 470.

[4] The fact of the existence of phenol as a constituent of the urinary secretion had been known since the researches of Staedeler.

It was not, however, supposed that free phenol existed in the urine in any of these cases, but rather a phenol-forming substance which when acted on for a sufficient time by dilute mineral acids yielded carbolic acid in the destillate. The nature of this phenol-producing substance, and particularly its relation to the sulphates of the urine, was shown by the subsequent researches of Baumann,[1] who found that coincidently with the appearance of phenol in the destillate a considerable increase took place in the inorganic sulphates contained in the residue. Thus it was found that if the quantity of pre-existing sulphate in the urine of a horse was determined and compared with the quantity existing after the action of hydrochloric acid, the proportion was about two of the former to five of the latter, whence it was concluded that the phenol-yielding body was a paired sulphuric acid of which the organic part was at that time unknown. Later, however, Baumann obtained this body by the following process :[2] the alcoholic extract of the evaporated urine is reduced to a syrup, and allowed to stand in a very cold place, when plates crystallise out, and are separated by filtration, afterwards dried, and purified by recrystallisation from strong spirit. By this means pearly white crystals are obtained of the nearly pure potassium salt of the phenol-producing substance. Baumann found that this salt had a characteristic fluorescence, and gave on analysis a composition corresponding to $C_6H_5KSO_4$. It is consequently isomeric with phenyl sulphonate of potassium $C_6H_4\left\{\begin{matrix}HO\\SO_2OK\end{matrix}\right.$; it was, however, shown not to be a sulphonate but an ether sulphate $(\left.\begin{matrix}C_6H_5\\K\end{matrix}\right\}SO_4)$, by the following reaction:— Phenyl sulphonate of potassium contains one atom of hydrogen easily replaceable by alcoholic radicals. Consequently, if equivalent quantities of a sulphonate, potash, and methyl iodide are heated in a closed tube with absolute alcohol, decomposition takes place at a little above 100° C. The substances found in the tube are potassium sulphite, and iodide of methyl is decomposed. Treated in the same way the urine salt (phenyl sulphate) yields sulphate, not sulphite, and the methyl iodide remains unaltered.

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[1] E. Baumann. Loc. cit.

[2] Baumann. Ueber gepaarte Schwefelsäuren im Organismus. Pflüger's Archiv, vol. xiii. pp. 289, 290.

It has already been stated that in cases of ileus studied by Salkowski, a phenol compound existed which, as may be understood from the preceding paragraph, was no doubt in the form of a paired sulphate. About the same time Brieger was making at Bern, in the laboratory of Professor Nencki,[1] those well-known researches respecting the aromatic constituents of fæces which led to the discovery of skatol.

Along with skatol he had also found phenol, a body with which it is closely related. Next followed his extensive and important investigation of the conditions which affect the excretion by the kidneys of phenol compounds in different diseases.[2] He indicated that their prevalence was entirely independent of the nature of the diet or of the existence in it of such constituents as might give rise to the production of phenol. Brieger observed that among fifty clinical cases of various kinds which were investigated, those alone were distinguished from the rest by the abundant excretion of phenol in which the patients suffered from septic diseases, particularly suppurating wounds, discharging empyemas and the like; whence he inferred that the fact of the excretion of phenol in abnormally large quantity in septic conditions would afford the key to the understanding of its cause. It had further been proved that indol, as a product of artificial intestinal digestion outside of the body, is exclusively due to bacterial action, that is, to the presence of bacteria in the experimental liquids used. Salkowski had found[3] that the paired acids in his cases of ileus were closely associated with the presence of an unusual amount of indigo-producing substance in the urine, which Jaffe's[4] researches had proved to be derived from indol. There was therefore every reason to infer the origin of phenol from sepsis.

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[1] Brieger. Ueber die flüchtigen Bestandtheile des menschlichen Excremente, Ber. der d. chem. Ges., vol. x. p. 1027.

[2] Centralblatt für med. Wiss., 1878, p. 545. Ueber Phenol-Ausscheidung in Krankheiten.

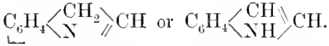
[3] He subsequently found that in many diseases the excretion of phenol and that of indigo are not parallel. See Centralblatt, 1878, p. 564.

[4] Jaffe. Ueber die Ausscheidung des Indicans unter physiologischen und pathologischen Verhältnissen. Centralblatt, 1872, p. 481.

The direct proof that "that substance which is generally regarded as antiseptic *par excellence* is itself a product of putrefaction" is contained in the first of the long series of papers published by Baumann (then of Strasburg, now of Berlin) on the aromatic bodies of the organism.[1] The fundamental observation is as follows:—An albuminous mixture to which a small quantity of pancreas has been added with the addition of a little carbonate of ammonium, is digested at 40°. About the sixth day there exists in the putrid mass, in addition to indol, a substance which has all the reactions of phenol. Indol is found at an earlier stage in the process and in larger quantity than the allied substance. The quantity, indeed, of phenol obtained by distillation in this case was small, only ·022 gramme weighed as tribromphenol in Baumann's first experiment from 200 grammes of material (pancreas and moist fibrin).

§ II.—*Indol as a Product of Sepsis.*

Indol receives its name from its being the nucleus from which the indigo group of chemical compounds is derived. It is itself a derivative of the aromatic nucleus C_6H_6, its structure being regarded as—



$$C_6H_4\left\langle\begin{matrix}CH_2\\N\end{matrix}\right\rangle CH \text{ or } C_6H_4\left\langle\begin{matrix}CH\\NH\end{matrix}\right\rangle CH.$$

In Kühne's earlier experiments on pancreatic digestion, when allowed to proceed without exclusion of septic organisms, he noticed the peculiarity of the penetrating smell, which he compared with that of naphthylamine. After the discovery of indol by Bayer in 1866 it was recognised that the odour was that of indol. The relations of this body to sepsis were fully elucidated in 1874 by Nencki. His experiment was as follows[2]:—300 grammes of serum-albumin were digested with 4½ litres of spring water and 400 grammes of minced ox pancreas at 40° for three or four days. The alkaline liquid was acidulated with acetic acid, and then distilled to about a quarter of its volume, the destillate made alkaline with caustic potash and shaken up with ether. The ether extract, on evaporation, left a reddish oil which had the characteristic smell of indol. This oil was dissolved in the smallest possible quantity of hot water, and from this pure indol crystallised out in shining plates, melting at 52°.

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[1] Baumann. Ueber gepaarte Schwefelsäuren im Organismus. Pflüger's Archiv, vol. xiii. pp. 289, 290.

[2] Nencki. Berichte der deutsch. chem. Ges., vol. vii. p. 722.

In the same year Kühne discovered that indol could be obtained by heating proteid with caustic potash. For this purpose he used albumin mixed with at least eight times its weight of alkali, moistened it, and heated the whole to dull redness in an iron retort. In this way the excessive frothing was avoided, and a destillate, smelling at first only of indol, was obtained When the contents of the retort had cooled, water was added, and it was again distilled. By this means Kühne[1] obtained crystals of a substance which had a higher melting point than pure indol (85° to 86°), and was therefore called pseudo-indol.

In 1878 Nencki repeated Kühne's experiments on the action of caustic potash on albumin, and found that the high melting point of the substance obtained by Kühne was due to its consisting largely of another aromatic body closely related to it in property and chemical constitution, which had shortly before been discovered by Brieger in fæces, and called by him in consequence skatol. Nencki's mode of procedure was as follows:— 50 grammes of albumin were heated with 500 grammes of caustic potash in a glass flask at 260° to 290°, as long as any water came over. The mass was then moistened with water and again subjected to distillation. The mixed destillates were treated with hydrochloric acid and picric acid, and the crystalline precipitate (1·2 gramme) collected on a filter, transferred to a retort, and distilled with weak ammonia. From the product of this second distillation he obtained ·048 gramme skatol, indol being also present. The original residue in the flask was dissolved in water filtered into a tubulated retort, and distilled after addition of dilute sulphuric acid. On neutralising the destillate and extracting it with ether, the ether extract yielded

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[1] Kühne. Ueber Indol aus Eiweiss. Berichte der deutsch. chem. Ges., vol. viii. p. 208.

0·152 gramme of tribromphenol. The neutral destillate after this treatment with ether was evaporated, acidulated with sulphuric acid, and distilled. In this way about 15 grammes of butyric acid were obtained.[1] By further researches Brieger, in 1880,[2] showed that the body which he had previously discovered in fæces, and which from its composition may be regarded as methyl indol ($C_8H_6CH_3N$), and which was obtained by Kühne as a product of the decomposition of albumin as above described, was really a characteristic product of proteid sepsis. Half a pound of casein was subjected to sepsis for five days, the product was distilled with acetic acid, the destillate neutralised and shaken with ether, the ether residue treated with picric acid and hydrochloric acid, the crystalline precipitate distilled with a weak solution of ammonia. The crystals in this destillate were dissolved in absolute alcohol, and the alcoholic solution diluted with eight to ten times its bulk of water, whereupon the skatol being less soluble separated out.

The remarkable physiological facts relating to the behaviour of indol in the organism point to a closeness of relation between it and the other products of sepsis, of which no chemical explanation can at present be given. It has been already mentioned that in 1875 Kühne proved that in experiments on artificial digestion indol does not appear unless septic bacteria are present, that it is not produced by the action of an albuminous compound of the digestive ferments, whether gastric or pancreatic. In the observations of Brieger, already referred to, relating to the aromatic constituents of fæces, it was found that on the whole there was a close relation between its prevalence and that of septic decomposition. The substance derives its chief interest from the fact, discovered by Jaffe, that it is not only capable of being absorbed from the intestines, and thus entering the circulation, but that it undergoes in the organism a very remarkable oxidation, in consequence of which it appears in the urine, not as indigo, but as the indigo-producing body, which was long known as indican.

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[1] Nencki. Ueber die Zersetzung des Eiweisses durch schmelzendes Kali, Journal für prakt. Chemie, N.F., vol. xvii. pp. 97–105.

[2] Brieger. Weitere Beiträge z. Kennt. des Skatols. Zeitsch. f. physiol. Chemie, vol. iv. p. 414.

The reason why this transformation must be regarded as an oxidation is, first, that the reverse process, namely, the production of indol from oxindol, and eventually from isatin, is one of reduction; and secondly, by the discovery of Nencki that indol when suspended in water and subjected to a stream of ozonised oxygen, gives rise to a certain quantity of indigo blue.

The proof that a similar oxidation, which at the time it was discovered had no counterpart in the laboratory, was due to Jaffe, who, proceeding on the fact already referred to, that indigo, and consequently the indigo-producing substance, abounds in the very cases which afford the conditions favourable to the formation of indol in the intestine, made experiments which consisted in administering weighed quantities of indol to dogs for the purpose of determining whether indol is or is not converted into indigo in the organism. The result was as he anticipated it would be. The quantity of indol was found in all the experiments to be fairly represented by the increased quantity of indigo-producing substance in the urine.

Since this important discovery was made, indigo, even when it appears in the small quantities in which we are accustomed to find it in human urine, has been regarded as probably an exclusively septic product, dependent not, of course, on the penetration of bacteria into the living organism or into the blood, but on their action in the intestines. In its relation to the urinary secretion and the mode of its discharge it very closely resembles phenol, for the indigo-producing substance is not identical with the indigo-producing substance of the indigo plant (indican), as was formerly imagined, but a paired sulphuric acid analogous to the phenyl sulphuric acid. The investigation of its nature was scarcely possible on account of the small quantity available for chemical examination, until its physiological origin from sepsis was known. Provided that indol is to be had, the production of any quantity of indigo-producing material can be determined by administering it with proper precautions to dogs. In this way Baumann was able to obtain from the alcoholic extract of the evaporated urine of dogs fed with indol a sufficient quantity of the indigo-producing substance as a crystalline potassium salt for complete chemical examination and analysis. This salt strikingly resembles in its characters the phenyl sulphate of potassium, and like it is easily transformed by warming with hydrochloric acid into sulphuric acid, and an amorphous brown substance insoluble in water, which, when treated with ether, alcohol, and chloroform, gives a red solution, the blue residue of indigo remaining. This reaction as well as the composition of the product, shows it to be indoxyl sulphate of potassium ($C_8H_6NSO_4K$).

[The following experiment serves to illustrate the relation of indol to the septic process:—On the 10th of November 1,200 grms. of washed fibrin were placed in a one per cent. solution of sodium carbonate, in the proportion of 250 grms. of fibrin to each litre of solution. To the mixture one 200th of the weight of finely minced pig's pancreas was added, after which it was placed in a warm chamber at 38° C.

On the 13th the liquid was full of septic organisms, the most common forms being spherules and chains. The digestion was continued for twenty days. During this period there was a large evolution of gas, which had the offensive smell of sulphuretted hydrogen. The product was distilled in a large glass retort to about one-sixth its original volume. The destillate, amounting to about four litres, was treated with half its volume (in successive operations) of ether.

The ether having been siphoned off and distilled, the light brown oily residue left was heated in a flask with weak caustic soda. The destillate crystallised as it came over. The whole of this destillate was next treated with ether, and the ether residue dissolved in the smallest quantity of hot water, and allowed to crystallise. It yielded ·250 grm. of pure indol, melting at 52°, which had a characteristic smell resembling that of naphthylamine, and formed a red compound with fuming nitric acid. This product (nitroso-indol) is said to be very unstable. It decomposed when dried over sulphuric acid in vacuo. It is insoluble in water containing fuming nitric acid, also in ether, but dissolves readily in alcohol, imparting to the solution a rich burgundy colour. No skatol was obtained. The alkaline residue in the retort was made acid, and again distilled. The destillate gave with bromine water a large precipitate of tribromphenol.]

§ III.—*Septic Derivatives of Tyrosin.*

Until a comparatively recent period tyrosin was the only known representative of the aromatic group among the products of septic or intestinal decomposition of proteid. It was well known to be always present, and could be easily recognised by its characteristic reactions. The relation of tyrosin to phenol is indicated, first, by the fact that phenol may be split off from it by the action of caustic potash, and secondly, by its chemical constitution. Tyrosin is an amido-acid belonging to the oxyphenylacetic acid series, that is, to a series of acids which corresponds to the acetic acid series, with the difference that the aromatic group C_6H_4OH has taken the place of hydrogen. From the lowest member of this series, oxybenzoic acid ($C_6H_4\left\{\begin{matrix}OH\\COOH\end{matrix}\right. = C_7H_6O_3$), phenol is directly formed by separation of CO_2. When, therefore, Baumann found in his earlier experiments that the product of long-continued sepsis of fibrin contained a body having the reactions of phenol, it naturally suggested itself that this phenol was not primarily derived from the proteid molecule, but secondarily from the splitting of tyrosin. In order to test this view experiments were made in 1879 by Dr. Weyl,[1] in Baumann's laboratory, of the following nature:—Tap water contaminated with sewage deposit (used as a septic ferment) was digested at 40° after addition of quantities of tyrosin varying from one to two grammes with free exposure to the air. On the fifth and sixth days faint indications of phenol were present, and the maximum reached nine per cent. of the calculated quantity. After ten days the tyrosin had entirely disappeared, no trace being discernible by Hoffmann's test. A second series of experiments of the same kind were made, but in such a way as to insure the exclusion of air. With this view the liquid was enclosed in a flask fitted with an indiarubber cork through which two holes were bored. Into one of these perforations a bent tube was introduced, with its end under mercury, the other contained a tube guarded by a clip. The whole was filled with liquid and placed in a warm chamber. From time to time small quantities were withdrawn to determine the amount of phenol produced. The results showed that phenol was produced in both forms of experiment, but in much larger quantities with exclusion than with access of air. The nature of the change which tyrosin undergoes when thus acted on by bacteria is shown in the following experiment.[2]

Six grammes of tyrosin in fifty grammes of water were digested in the warm chamber for two days after addition of a fragment of putrid pancreas. The product, which yielded no tyrosin, was concentrated to one-sixth of its volume, and treated with ether, after acidifying with sulphuric acid. The ether extract was evaporated, and the residue mixed with a little water to separate fatty acids insoluble in water. The further separation of the higher acids in the filtrate was ensured by precipitating with lead acetate. After removal of the lead the colourless filtrate crystallised on evaporation. The acid so obtained corresponds to the formula

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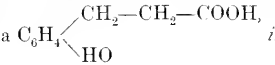
[1] Weyl. Spaltung von Tyrosin durch Faülniss. Zeitsch. für physiol. Chem. vol. iii. p. 312.

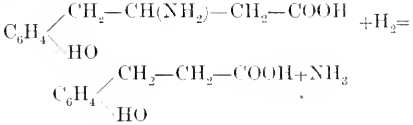
[2] Baumann. Ber. d. deutsch. chem. Ges. vol. xii. p. 1450, and vol. xiii. p. 279.



$$C_6H_4\left\langle\begin{matrix}CH_2-CH_2-COOH,\\ HO\end{matrix}\right.$$

i.e., hydroparacoumaric acid.[1]

This is, therefore, the proximate product of the septic decomposition of tyrosin; for this body, in accordance with what has been stated above, is amidohydroparacoumaric acid, and gives the so-called tyrosin reaction, which property it has in common with all the aromatic oxyacids of this series. The way in which bacteria bring about the decomposition may be best understood by supposing that in the manner already explained they first act on some body capable of yielding nascent hydrogen. The amide is thus split off as ammonia, as follows:



$$C_6H_4\left\langle\begin{matrix}CH_2-CH(NH_2)-CH_2-COOH\\ HO\end{matrix}\right. +H_2= C_6H_4\left\langle\begin{matrix}CH_2-CH_2-COOH+NH_3\\ HO\end{matrix}\right..$$

The subsequent progress of the change corresponds to that by which the fatty acids of the acetic series are acted on by septic ferments, paroxyphenylacetic acid being formed from the hydroparacoumaric just as acetic from propionic, and in like manner paroxybenzoic (or paroxyphenylformic) from paroxyphenylacetic. The body last mentioned, the immediate source of the carbolic acid (C_6H_5HO), which for the present we may regard as the last link in the chain of septic products, has been proved experimentally to be directly producible from it by the action of septic ferments.

In like manner the parakresol, which differs from carbolic acid only by the addition of CH_2 (it being $C_6H_4(CH_3)HO$), is similarly derived from the next aromatic fatty acid in the series, namely paroxyphenylacetic acid. Consequently we have the following series, beginning from tyrosin:—tyrosin, hydroparacoumaric acid, paroxyphenylacetic acid, parakresol, paroxybenzoic acid, and carbolic acid, all of which may be regarded as steps in the septic process. The evidence that they are so is derived from experiments similar to those already referred to, in which, instead of proteid material being used directly, a recognised pure product of proteid splitting is used, such as tyrosin. The most important of these experiments are those of Baumann, who dealt in the same way with the subsequent stages of the process. Thus when he subjected 12 grammes of hydroparacoumarate of ammonia in 6 litres of water contaminated with sewage to sepsis for ten days, and then distilled the product, he obtained (in the destillate) parakresol and phenol, while the ether extract of the residue yielded oxyphenylacetic acid in sufficent quantity for analysis. The septic genesis of hydroparacoumaric acid from tyrosin having been already proved, this experiment afforded all that was wanting to complete the chain of empirical evidence.

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[1] So called from its original source, the tonka bean.

§ IV.—*Aromatic Acids of the Acetic Series.*

In 1879 it was discovered by E. and H. Salkowski[1] that in the sepsis of proteid substance, volatile aromatic acids were produced which do not belong to the same series as those referred to in the preceding paragraph as derivatives of tyrosin, but to the series in which an atom of hydrogen is replaced in the fatty acid radicle by $C_6 H_5$, *i.e.* phenyl. Of these the first discovered as a septic product was hydrocinnamic or phenylpropionic acid. It was obtained by subjecting a liquid in which proteid was dissolved or suspended, made slightly alkaline with carbonate of sodium, to prolonged sepsis. The alkaline liquid having been concentrated by evaporation, was extracted by alcohol, the alcoholic extract was then evaporated, acidulated with dilute sulphuric acid and shaken with ether. The only residue which the ether left on evaporation contained, in addition to the higher fatty acids, the lower members of the series along with their aromatic relatives, particularly, when fibrin or muscle was used, phenylpropionic acid—when blood-albumin was used. phenylacetic.

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[1] E. and H. Salkowski. Weitere Beiträge zur Kenntniss der Fäulnissproducte des Eiweisses. Ber. der deutsch. chem. Ges. vol. xii. p. 648.

In consequence of these facts, it suggested itself to Dr. Wernich[1] that in all probability these bodies, for reasons which were set forth in my memorandum of last year, were likely to have an important influence on the septic process itself, and he accordingly made experiments which had for their purpose to ascertain, first, whether they were antiseptic, secondly, whether they had the power of rendering a cultivation liquid unfit for the growth of bacteria, and, if so, in what proportion, and, lastly, whether they possessed the property of annulling the vitality of septic organisms when allowed to act on them for a limited time, and, if they had this power, in what degree?

With reference to the second and third of these questions it was found that both bodies were decidedly superior to carbolic acid, and that of the two phenylpropionic acid was the more active. But their value as disinfectants was not then enquired into: no experiments were made to determine in how far they possessed, in addition to the power of annulling the vitality of septic microphytes, that of preventing infection or destroying the potentiality of those which are morbific. It is this question which has been made the subject of the remarkable investigations by Dr. Klein which are recorded in the following papers.

Of his results all that need be said here is that although both of the bodies in question possess in a high degree the power of killing morbific microphytes, the higher of the two acids is the most powerful. If then, either is to be practically useful as a disinfectant, phenylpropionic acid must have the preference. As a product of sepsis, the quantity in which the acid is produced is, it need scarcely be repeated, exceedingly minute. In the laboratory it was obtained for use in Dr. Klein's investigation by the action of sodium amalgam on cinnamic acid, so that it is at present an expensive product. Notwithstanding this, there appears reason to hope that it might be used as a colytic with success. It has been administered continuously to rabbits in considerable doses without disturbance of their health, and has lately been taken in repeated doses by several workers in the physiological laboratory at Oxford. As was proved experimentally by Salkowski,[1] it is converted in the organism, in the first instance into benzoic acid, and discharged in the urine as hippuric acid.

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[1] Wernich. Die aromatische Fäulnissproducte und ihre Einwirkung auf Spalt- und Sprosspilze. Virchow's Archiv, vol. lxxviii. p. 51.

§ V.—*Indications for Future Experiments.*

In the further prosecutions of the enquiries respecting disinfection which have now been entered on, we shall be guided in the selection of the substances to be investigated by the principles already laid down in a paper published by the Local Government Board in 1883,[2] namely: first, that no chemical or other agent can be rightly regarded as disinfectant in respect of any disease unless it can be shown to have the power of inhibiting or arresting the development and growth of the particular species of microphyte which is the constant concomitant of the morbid process; and, secondly, that inasmuch as all *specific* microphytes are endowed with the power of multiplying in the blood and living tissues of the organism they infest, and of there playing their part in the morbid process, all *specific* disinfectants must, in order to encounter the organisms they are intended to destroy, be of such a nature that they can, without prejudice, be mixed with the circulating blood, and come into direct relation with the tissues.

To carry out the first of these indications seems at first sight to be so difficult that it might be regarded as hopeless, for it involves the gauging of each supposed disinfectant, not according to its action on microphytes in general, but according to its influence on the development and vegetation of a particular species. The difficulty arises simply from the fact that even now, after so much labour has been spent and such brilliant discoveries have been made, our acquaintance with specific microphytes is notwithstanding exceedingly small. There are, indeed, only one or two species in respect of which we know the development and conditions of growth with anything like completeness. This being so, it seems reasonable to believe that the most hopeful line of work that can be followed is to determine with all possible precision the physiological relations of these best-known contagia to their surroundings, with a view to the discovery of the conditions which are most inimical to their growth and activity. But there is no reason why we should not at the same time extend our experimental researches to the less known infections, in the hope that the search for antidotes to these contagia may, if systematically conducted, turn out to be among the most effectual means of advancing towards a better knowledge of their nature.

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[1] E. and H. Salkowski. Ueber das Verhälten der Phenylessigsäure und Phenyl propionsäure im Organismus. Ber. der deutsch. chem. Ges., vol. xii. p. 653.

[2] See *Supplement to the Twelfth Annual Report*, p. 213.

In looking to chemical knowledge for suggestions in our contest with the specific agents of disease, we are unquestionably applying to the right source for aid, but in doing so we must not forget that no single advance forwards can be made otherwise than by pathological experiments, that such experiments are in the highest degree difficult to carry out, and that there is no limit to the time which they occupy. Nor must it be forgotten that, even after the labour of discovery has been got through, and we have joyfully cried *εὕρηκα*, what are called practical difficulties are sure to come in of such a kind as to render our achievements in a utilitarian sense fruitless.

Reviews.

De la Phtisie Bacillaire des Poumons. By Professor GERMAIN SÉE. 2 Plates. 8vo, pp. 627. Paris: 1884.

WHILE the majority of pathologists and clinical physicians, though accepting the reality of the tubercle-bacillus, have hesitated to declare the modifications in their views necessitated by this discovery, Professor Sée boldly steps out with a complete treatise on the pathology and treatment of phthisis, based on the bacillus. His definition of the aetiology and nature of phthisis may be summed in a few words; phthisis is an infective disease due to a specific micro-organism, which is inoculable on animals, and transmissible from the sick to the healthy person by way of direct contagion, though frequently propagated by way of heredity. It may be localised in a single organ and a cure may thus occur, but it may be rapidly or slowly spread throughout the whole organism and lead to its destruction.

He then gives a short account of microphytes in general—of their nature, multiplication, and functions, and of the pathogenic microphytes in particular, their conditions of existence, and modes of spreading. He divides the microphytic diseases into five classes, the second of which is characterised by him as that of the truly parasitic dieases—*Maladies microphytiques inoculables et en même temps transmissibles par l'atmosphère.* This class includes: (1) Tuberculosis; (2) Variola; (3) Diphtheria; (4) Relapsing Fever; (5) Erysipelas; (6) Infectious Pneumonia; (7) Typhoid Fever.

A paragraph is then devoted to the history of the discovery of the tubercle-bacillus, in which due credit is given to Koch, and Baumgarten is also mentioned as having indicated the presence of the bacillus, without however being able to render it evident, which latter was only effected by the colouring processes suggested by Weigert, perfected by Koch himself, and further modified by Ehrlich and others. He describes the presence of the bacillus in the granular tubercle, in the giant cell, in the sputa, in all caseous masses, scrofulous glands, scrofulous bones, in various local tubercular processes, as those, for instance, of the urogenital organs and in lupus (Cornil), and points out the possibility of these local affections remaining local throughout life, or forming through the medium of the lymphatic vessels or veins the focus for general tuberculosis.

After having described the different forms of tubercle and its modes of development into tuberculous phthisis, Sée discusses the so-called caseous pneumonia and classes it under the head of true tuberculosis on account of the results of inoculation and of the presence of the bacillus. He thus vindicates the correctness of Laennec's view that there is only one form of phthisis, namely, the tuberculous (or now bacillary) phthisis. The miliary granule, the grey or yellow tubercle, the grey or yellow infiltration are all of the same nature, and all characterised by the bacillus. There exist also ordinary inflammatory granulations, but these have nothing in common with the true tubercle excepting the shape; they do not contain the bacillus, and inoculation with them does not give rise to true tuberculosis.

In the section on the *causes of phthisis*, the author first gives an account of *experimental* phthisis in animals produced by inoculation, and then discusses the *external causes* which may give rise to tuberculosis in man. He points out that the ordinary circumstances of the air are not favourable to the development of the tubercle-bacillus, which requires a constant temperature of at least 86° F.; that the bacillus can only fructify in the animal body, which may therefore be regarded as the host of this parasite; that, however, when once developed, the bacillus retains its vitality in the culture liquid for years; and in phthisical sputa, even during the process of putrefaction, for many weeks.

As the most certain mode of transmission Professor Sée regards air charged with the dust of dried consumptive sputa. Fortunately, however, the bacillus, like ordinary dust, may be arrested in the nares and upper portions of the respiratory tract, and even after having entered the lower passages it may be expelled again by the action of the epithelium. Stagnation of the air and mucus in certain parts of the lung from imperfect movements of the thorax may favour the settlement of the bacillus, hence the frequent commencement of phthisis in the apices. He alludes to the positive effects of inhalation of pulverised bacilliferous fluid and pulverised sputa on animals, while the inhalation of air vitiated by the breath of consumptives has only led to negative results in Tappeiner's experiments.

In a chapter on the conditions of "phthisiogenic atmospheres" he mentions that the air of large towns, or crowded localities, is rich in microphytes, while that of high elevations is more or less free.

Under the heading of "Alimentary Phthisis" the dangers of infection through food are considered, and especially through bacilliferous milk from consumptive cows, which, fortunately, can be rendered innocuous by boiling.

In a paragraph on "*Régime alimentaire phtisiogène*" the author mentions the hypothesis of Ritter that food rich in salts of potassium may favour the development of phthisis, and that possibly herbivorous animals are on this account more liable to tuberculosis.

From the preceding statements it must be clear that the author is a thorough contagionist with regard to phthisis, and he places possibility of infection by contagion under the following categories: 1, the matrimonial contagion; 2, the family contagion, from one member of the family to another; 3, from habitual intercourse with consumptive persons; 4, from repeated visits to consumptives; 5, from living together in crowded institutions, such as barracks.

The greatest influence in the aetiology of phthisis Professor Sée attributes to heredity, and he thinks that this influence will be more generally recognised if it is considered that the different forms of scrofula are of tuberculous nature, as also many bronchopneumonic affections and occasional hæmorrhages in young persons, which affections are frequently arrested, and remain localised, perhaps encapsuled for life, or may in later years flare up into activity. He further mentions that heredity may show itself or remain unnoticed in "phthisiogenic diseases," especially diabetes, which is so intimately allied to phthisis that in the same family a diabetic may be the parent of a consumptive, and *vice versâ*.

While the majority of pathologists recognise only the inheritance of a *predisposition*, Sée believes in the direct transmission of the virus through the placental blood to the fœtus.

In a chapter on "*Causalité pathologique*," the author considers some diseases which are regarded as favouring, and others which enjoy the reputation of being antagonistic to phthisis. We have already mentioned diabetes as favourable, to which must be added the microphytic diseases, rubeola, pertussis, and syphilis; while the reputed antagonism of malaria, alcoholism, cancer, gout, and cardiac diseases, appears to the Professor unfounded. Asthma and emphysema, on the other hand, seem to be in some degree, though not entirely, incompatible with tuberculosis.

Conditions of weakness from defective food, from insufficient quantity of air, from physical over-exertion, from chronic diarrhœa and dysentery, and states of analmia, appear to the author not to belong to causes which favour phthisis. On this head we might, perhaps, differ from him, by being inclined to think, from actual experience, that persons in such states of weakness fall more easily a prey to phthisis than the robust. We must confess, however, that the subject admits of discussion, and that the proof is almost impossible.

In the clinical part the author considers the different aspects of phthisis, and shows that in many forms of latent phthisis the diagnosis can be made only by the examination of the sputa, which latter, by the presence of the bacillus, gives the incontestable corroboration of the diagnosis in the latent as well as manifest cases. It is impossible for us to give even the shortest account of the contents of these chapters, but we may recommend their attentive perusal. In a chapter on pleuritic phthisis (*phtisie pleurale*, p. 293-298) he gives a description of the different forms of pleurisy with and without effusion. After referring to the not very unusual cases, where ten or fifteen years or even at a longer interval after an occurrence of pleurisy phthisis develops itself, he puts the question, Has the pleurisy been the *cause* or the *first manifestation* of phthisis? The former hypothesis he thinks quite unworthy of serious consideration (*la première hypothèse ne supporte pas un examen sérieux*); the second is much more plausible. Without contesting that this view is correct for the majority of cases, we cannot see that pleurisy of one side leading to adhesion and imperfect motion of the corresponding lung should not facilitate in that lung the occurrence of stagnation of air and mucus, and thus favour infection, as the author concedes may happen from imperfect formation of the thorax.

The portion of the work devoted to the treatment of phthisis is headed by a sensible chapter on hygiene, in which the author alludes to the danger from the flesh of infected animals of the bovine race, and to the milk; to the necessity of disinfecting the sputa; to the importance of gymnastics, air, and regulated diet. In a chapter on climate he pays special attention to the climates of high elevations and of the seashore, and regards them in the light of their aseptic character.

Among the medicinal substances the different preparations of iodine and arsenic receive the author's principal attention; but also the fatty and nutritive substances (milk), the aromatic antiseptic drugs—as benzoic acid, creasote, and turpentine—are discussed, and sulphur and sulphur waters receive their share. In another group, the mineral food-salts are considered, viz., the phosphates of lime, phosphorus, common salt, and the alkaline salts.

In a paragraph on the prognostic value of the number and form of the bacilli the author is obliged to say—that the course and duration of the case cannot be foretold by the bacillary examination alone.

We have said enough to show that the book before us is original in its conception and may be read with great interest and advantage by every student of medicine.

We ought not to forget to mention that not only have the researches of France received the author's attention, but in an equal degree those of Germany, England, and Italy, and that they have been appreciated by him with scientific impartiality.

A Manual of Diseases of the Throat and Nose. Vol. II. *Diseases of the Œsophagus, Nose, and Naso-pharynx.* By MORELL MACKENZIE, M.D. London: Churchill. 1884.

THIS volume opens with a consideration of the œsophagus and its diseases, to which subject the author has wisely devoted nearly half the work. The anatomical introduction contains some original observations on the measurement of the gullet, from which it appears that its "transverse diameter is very considerably greater than the antero-posterior measurement." This fact has suggested to the author a modification in the shape of the œsophageal bougie for exploration purposes, which he now has made somewhat flattened in the antero-posterior diameter, by means of which the facility of introduction, as the reviewer can testify, is distinctly enhanced. The process of auscultating the œsophagus will be new to many readers; it is followed by a description of the author's œsophagoscope, for visually inspecting the lumen of the gullet. Both these methods of arriving at exact diagnosis necessarily require much practice before they can yield useful information, on which account they are scarcely likely to be generally adopted.

An exhaustive description of the instruments required for exploring and operating on the several regions treated of will be found attached to their respective sections. All are admirably illustrated, and the methods of using them clearly portrayed. Separate sections are devoted to acute œsophagitis, a somewhat rare but much-neglected disease; to the traumatic phase of inflammation following the swallowing of corrosive fluids, and occasionally from the stings of insects similarly ingested; to chronic œsophagitis; varicose veins of the gullet; peri-œsophageal abscess; thrush of the gullet; diphtheria; cancer; syphilitic contractions; diverticula; general dilatation; cicatricial stricture; rupture of foreign bodies in, paralysis of, malformations of, and finally to post-mortem softening of the gullet. Each subject is exhaustively considered, a uniform plan being adopted for all. The literature and history of the disease, where it is fortunate enough to have any, precede the purely medical handling of the subject. This latter leaves nothing to be desired. Taken altogether it may claim to be the best treatise on diseases of the œsophagus in the language, and undoubtedly constitutes the most valuable portion of the book.

The remainder of the book is devoted to diseases of the nose and naso-pharynx. In dealing with acute catarrh too much insistence is placed on its abortive treatment, a method which ignores precedent constitutional states for which a cold is often a salutary outlet. Hay asthma receives a section very similar to the previously published brochure on the subject. The theory is maintained that pollen is the exciting cause, the recipient having an undefined idiosyncrasy. Chronic nasal catarrh and dry catarrh follow, the author in the latter opposing the theory of syphilitic influence as the predisposing cause; though it does not appear that the reasons advanced in support of this negation detract much from the more generally accepted view of those observers who accept the enthetic hypothesis. The chapter on nasal polypus contains much research into the literature of the subject, and but little definite or new light upon the ætiology of the disease. It is, however, of interest to every practitioner of surgery, and the more conservative of these will perhaps derive comfort from the fact that the method of evulsion by forceps is not wholly condemned, when contrasting it with the more refined and less painful plan of treatment by the galvano-cautery. Cancer, syphilis, tubercle, lupus, rhinoscleroma, glanders, fractures and dislocations, rhinoliths and maggots in the nose, are severally and eruditely discussed—in fact with almost too large a predominance of the literary element. The chapter on septal deviation gives an analysis of skulls in the Museum of the College of Surgeons, with the view of determining the frequency of its occurrence. This is interesting, doubtless, but by its prominence attention is diverted from the cartilaginous portion of the septum, which affords by far the larger contribution to the deformities which demand surgical interference. Cartilaginous outgrowths of inflammatory origin, which constitute a large percentage of lesions of the septum, receive no notice from the author. The chapter on anosmia, loss of smell, is good as far as it goes; the contention that paralysis of the seventh nerve by diverting the tears from the nose causes anosmia by lessening the moisture of the pituitary membrane is open to question. An important omission in this section is the failure to notice the various neoplasms of the spongy bones which intrude upon the septum, and which not only impair the function of the olfactory nerves by the pressure exerted upon them, but also cut off access of air to the olfactory region.

Space will not permit of an analysis of the latter sections of this volume, which is the less necessary as their interest is for the most part literary only. Notwithstanding a certain want of proportion in respect of some of the subjects discussed, and perhaps a falling off in the latter part of the second volume from the high standard maintained in the first—and we readily concede that in the regions of the larynx and trachea Morell Mackenzie is *facile princeps*—these two volumes cannot fail to add to the reputation of their author both as a writer and a specialist.

On some important points connected with the Surgery of the Urinary Organs. By Sir HENRY THOMPSON. 8vo, pp. 147. London: Churchill. 1884.

Tumours of the Bladder. By the same.

THESE two books may be regarded as the latest exposition of the most approved doctrines of urinary surgery. Commencing with the subject of stricture, the author devotes his subsequent chapters to the consideration of tumours of the bladder, and the recent progress of lithotomy and lithotrity. It is not a little remarkable that whilst insisting on the need of division in cases of stricture, and emphasising this with the words, "If you cut at all, cut all," Sir Henry Thompson should have entirely ignored the doctrine of reflex deep strictures which was, we believe, first enunciated by Otis, and has received subsequent confirmation in this country as well. It has been recorded by Otis, that the division of a meatus stricture causes the disappearance of one more deeply situated, and we ourselves have witnessed more than one similar instance. Otis' views on the size of the urethra are dismissed in a few lines, and indiscriminately associated with the crude suggestions of Boyer and Mayor, and Sir Henry Thompson has seemingly forgotten that it is to these "exaggerated estimates of what is not very happily called urethral calibre," that we are indebted for the latest improvement in lithotrity, namely, evacuation at one sitting, which was first regularly employed by Bigelow, and which Sir Henry has since adopted and, as he tells us, "proved its value." It seems a pity, too, that no records are given of the number of cases in which recontraction took place after the division of a stricture. We are told that "the reply to this question cannot be simple and categorical." Why not? Surely it is as easy to tabulate such cases as those of stone, and certainly no less important. When we turn to the question of digital exploration of the bladder through a perineal incision, it is pleasing to feel that we are once more in accord with the views of our distinguished author. The best results have already accrued from a procedure leading to the diagnosis of what was before uncertain, and the safe removal of what was before deemed impracticable; not to mention the gain arising from an opening for mere drainage in a bladder which is exhausted by chronic cystitis. The lectures on stone are merely a further continuation of what has already appeared from the author's pen, and show a series of operations unrivalled either in number or successful termination by those of any other surgeon past or present. It would even seem as though larger stones could be evacuated by lithotrity than can be extracted by the perineum. For those which are beyond the reach of lithotrity it is suggested that the suprapubic operation as modified by Petersen should be employed. On returning once more to the urethra, one is surprised to find no mention of a plan of treatment for enlargement of the prostate proposed by Mr. Reginald Harrison of Liverpool, more than a year ago, which consists in the puncture of the enlarged prostate with a trocar, and which in one case at least was attended by the most brilliant success. Notwithstanding these omissions, our readers will find in these pages very much that is both interesting and instructive.

Clinic of the Month.

Diagnosis of Peroneo-tibial Sprain.—A case recently occurred in the service of M. Labbé, at the Beaujon Hospital, which well illustrated the difficulties sometimes encountered in the diagnosis between sprain at the ankle-joint and fracture of the fibula. There are four traumatic lesions which are usually found in this locality; (1) Tibio-tarsal sprain, properly so called, and, perhaps, the most rare; (2) Medio-tarsal sprain—these two varieties are easily distinguished from each other; but great difficulty is sometimes encountered in differentially diagnosticating (3) Peroneo-tibial sprain, or distension of the ligament which unites the tibia with the fibula—from (4) Fracture, with tearing of the external malleolus. In order not to fall into an error which would be decidedly disadvantageous to the patient, it should be noticed that in peroneo-tibial sprain the ecchymosis is seen a little in front of the anterior border of the fibula, while in separation of the external malleolus it is behind the bone, in the depression which separates it from the tendo Achillis. With regard to the pain, in the case of fracture it is seated immediately over the bone itself; but in the case of the sprain, the greatest pain is found in front of the anterior border of the bone. It is in these cases that the elastic bandage has such excellent effects. (*Revue de Thérap.*, July 15, 1884.)

New Method of Reducing Dislocation of the Lower Jaw.—Dr. Massey writes that, by introducing the little finger into the ear, one can feel the joint of the lower jaw move quite easily. A case is related of a young girl, aged sixteen, who had noticed a contraction in the entrance to her right ear, which was caused two years previously by dislocating the jaw during a fit of yawning. Dr. Massey ordered the girl to force her little fingers into the ears whilst he manipulated with the articulation. The patient opened and shut her mouth rapidly six times, then a snap was heard, and the dislocation was at once reduced. (*Med. Times*, April 1884, p. 583.)

The Effects of the Injection of Perosmic Acid into the Living Tissues.—The parenchymatous injection of perosmic acid having been recommended in the treatment of neuralgia, Fränkel, of Hamburg, has made some experiments on animals in order to ascertain the local effects of the remedy upon the tissues exposed to its direct action (*Berliner klinische Wochenschrift*, 1884, No. 15). He found upon microscopical examination, sixteen days after the first injection, marked changes both in nerve and muscle. In the former many of the nerve-fibres were broken down, showing total loss of the axis-cylinder and complete degeneration of the white substance. He also recognised the presence of an epineuritis leading to formation of nodes and compression of the nerve-trunk. The muscular tissue in its parenchyma, as well as its interstitial connective tissue, was badly injured; the muscle-bundles were often of a waxy appearance, and were not clear in their striations; but even in others where the striated appearance was well preserved the contractile substance was coloured of a dirty-brown tint, and was reduced in diameter. With staining preparations (eosin and hæmatoxylin or methyl-blue) it was demonstrated that there was a high grade of interstitial myositis present, with diminution of the muscular parenchyma. It was noticed that the affected muscles refused to take up the eosin which stained the normal muscle a beautiful red. It was also observed, as an interesting fact, that the axis-cylinder of the nerve-fibres is stained during life by the osmic acid just as it is after death. Perhaps this may, in part, explain its use in neuralgia. Although the effects of the remedy are local, they are likely to be durable; caution should therefore be exercised in using osmic acid injections for the relief of neuralgia or in the treatment of tumours. In a case of goître, in a young man nineteen years of age, L. Szuman injected the one-per-cent. solution into the enlarged gland about twice weekly for a period of three months, with most decided results in reducing the size of the tumour and permanent relief of the dyspnœa. (*Centralblatt für Chirurgie*, No. 28, 1884; *Phila. Med. Times.*)

Plastic Surgery of the Nose.—After alluding to a case in which he had remedied the absence of a cartilaginous septum, Professor Mikulicz goes on to describe a case in which he had to restore considerably more. In his previous case the nose was separated from the face, fixed to a gutta-percha mould, and kept in position by plugs placed in the nostrils. In this mode of operation much difficulty is experienced in the later stages by the subsequent contraction of the cicatricial tissue, and the return of the nose to its previous condition. A great deal, too, depends on the care which the patient bestows on himself after the operation. To obviate all these difficulties Mikulicz has introduced the following changes, which have succeeded admirably. The gutta-percha mould is employed as before, one end of it being fixed firmly to the frontal bone, the lateral supports being obtained by its resting on the pyriform incisions at the side, which are made when the nose is lifted up from the face. The two halves of the mould are united by a hinge, and plugs employed; by this means the proper position can be readily maintained. From each side of the pyriform incisions two pieces of periosteum, extending from the upper jaw to the edge of the orbits, with the superjacent soft parts, are elevated and united in the middle line, thus making a solid bridge to the nose. The two sides are retained in position by two pieces of platinum wire for a fortnight. At the end of this time the wires are removed, and the two sides kept in close apposition by clamps. After a little time the clamps are employed only by night, and a *pince-nez*, with two plates of glass and horn by day. To remedy the absence of septum, Mikulicz chose a patient in the first instance with a very long nose. The edges of the newly-made nose were pared, and two flaps cut from the alæ, and brought together in the middle line to form the columella, which was soon tightly attached. To make up for the flaps which had been cut from the alæ, the nose was shortened a little, and the skin and mucous membrane united. The result was a well-proportioned nose, a little shorter than natural. In one case where there were only some rudimentary remnants left, two flaps were cut from the cheek at the side of the nose; these were brought together, and employed to form the nasal framework, after which the rest of the rhinoplastic operation was performed as usual. (*Centralblatt für Chirurgie*, p. 448, July 1884.)

The Relation of Ankle-clonus to the Patellar Reflex.—M. Maurice de Fleury of Bordeaux contributes a few notes of interest on this point. In the first place he cites five cases where there was ankle-clonus along with no increase of the patellar reflex such as usually accompanies it. This happened in chronic rheumatism twice, in a bruise and sprain of the ankle, and in fracture of the tibia and fibula after good union. Further, in three other cases of convalescence from typhoid the ankle-clonus was marked, though it disappeared on complete recovery, whilst the patellar reflex could not be elicited at all. But the most important experiments were some made under the direction of M. Pitres. Cases were taken of late contraction following hemiplegia, in all of which both ankle-clonus and great exaggeration of the reflex of the patellar and Achilles tendons were present. Esmarch's bandage was applied carefully to the contracted leg from below upwards, so as to press out the blood. In a few minutes no ankle-clonus could be obtained; in a few minutes more the contraction had completely disappeared, but throughout the exaggeration of the reflex of the patellar and Achilles tendons was undiminished. In cases of disseminated sclerosis, by a similar method the ankle-clonus was stopped whilst the tendon reflexes remained exaggerated, and the anæmia induced in the leg was not sufficient to prevent voluntary movement. In none of the cases were the bandages applied for more than thirteen minutes; in one case the results were obtained after six minutes. M. de Fleury does not commit himself to any conclusions from these observations beyond saying that they suffice to show that the causes of ankle-clonus and increased patellar reflex cannot be the same. (*Revue de Médecine*, August 1884.)

Iodide of Potassium in Pneumonia.—Thinking that pneumonia should be considered not as a local disease with general symptoms, but as a local manifestation of a general disease, Schwartz has proposed the administration of iodide of potassium in doses of gr. vj every two hours, with the application of an ice-bag over the pneumonic focus. Iodide of potassium acts against the causal agent of the pneumonic process; and, when given at the commencement of the disease, arrests its effects, causing complete and quick recovery. All of the cases thus treated by Schwartz were cured, and in one-tenth of the cases recovery took place on the second day. Riebe obtained equally good results. Dr. Gualdi (*Boll. della R. Acad. Med. di Roma*) has employed this method of treatment in thirty-nine cases, and with excellent results. In all of the cases he noticed that in about two days the sputa lost their pneumonic characteristics, changing from the viscid and tenacious to the serous and fluid state; the fever disappeared, and dyspnœa ceased, whilst the physical state of the lung had not changed, and in some cases was worse; and it was also noticed that the appetite of the convalescents was such that the amount of food had to be decreased. The mortality was six in 100, but two of the fatal cases could not strictly be included, as they became wildly delirious early in the disease, and only took gr. xxx of the iodide. It is noteworthy that, under this treatment, whilst the fever and dyspnœa disappear, the lung remains in the same state. This seems to justify the opinion of Jürgensen that the dyspnœa is dependent upon the fever, and not upon the changes in the state of the lung. Dr. Gualdi draws the following conclusions as to this method of treatment: (1) the method of Schwartz gives excellent results in pneumonia; (2) these results are better with children than with adults; (3) this treatment should be commenced at the beginning of the disease, as the result is then immediate and perfect; (4) the advantages are seen in the effects upon the fever and dyspnœa, not upon the local lesions; (5) the action of the ice is secondary in the sense that it bears on the effects and not on the cause of the disease. It is useful in the stage of congestion, but injurious at a later period, when the contents of the alveoli are coagulated and the lung indurated. (*Bull. Gén. de Thérap.*, August 15, 1884.)

The Effects of Bromoform, Bromethyl, and Bromethylene.—Bonome and Mazza, from a series of physiological experiments recently conducted in the laboratory of Professor P. Albertoni, in the university at Genoa, obtained the following results: (1) *Bromoform* is a general anæsthetic. Dogs and guinea-pigs almost always show the same symptoms of anæsthesia and muscular relaxation, following inhalation, that the human subject does. In five experiments upon men, three were well narcotised, the effect lasting for a whole hour; in two (probably on account of the use of a defective preparation containing free bromine) there was no narcosis, but, on the contrary, irritation of the conjunctivæ, a flow of tears, burning in the eyes, &c. The narcotic action they believe to be a little slower in appearing than when chloroform or ether is used, but the success is apparently the same as with both of these valuable anæsthetics. (2) The narcosis obtaiued from the inhalation of bromoform is free from the stage of exaltation which we are called upon to witness during chloroform administration. On this account preference should be given this agent in case the patient is subject to epilepsy or alcoholism. Billroth and Nussbaum have each directed attention to the danger of exciting attacks in epileptics by the use of chloroform. This does not occur during the use of bromoform, which allays the irritability of the cerebral cortex. (3) Bromoform does not disturb the respiratory function, but after prolonged narcosis there is a slight reduction of the blood-pressure. The respiratory fluctuations of the blood-pressure in the course of the narcosis are very regular; the pulse remains strong. In none of the dogs which inhaled it did the bromoform cause sudden arrest of the heart's action, such as is seen during the use of chloroform. (4) During the bromoform narcosis, while it was noticed in dogs that there was decided mydriasis, in man there occurred only trifling alterations of the pupil; there was neither nausea nor vomiting. The quantity of bromoform required to produce complete narcosis is less than that of chloroform as it is commonly used. (5) In the first few hours after narcosis, it was noticed that there was a sinking of the temperature exactly as after chloroform; but the patient appeared to recover sooner from its effects. (6) Given by the mouth, bromoform also acts as a hypnotic and anæsthetic. (7) Moreover, bromoform prevents putrefaction in organic substances (urine and meat); bacteria are not developed in the presence of bromoform. (8) Injected under the skin, bromoform is fatal when given in a dose of 0·15 gm. for every 100 gm. of the bodily weight. *Ethyl bromide* produces narcosis more quickly than chloroform or bromoform, but is more easily eliminated from the system, and, on this account, its effects are more temporary. It is to be recommended for short operations. It is less active than bromoform, and becomes poisonous at a point of 0·17 gm. for each 100 gm. of the bodily weight. Whilst the narcosis reduces the blood-pressure (20—30 mm.) at first, it rapidly increases again after the termination of the narcosis, when the respiration also is accelerated. Bromide of ethyl also reduces the irritability of the cerebral cortex, and likewise hinders the development of bacteria in organic infusions. *Ethylene bromide* does not produce complete narcosis upon inhalation, but, when pushed, causes fatal results by abolishing the cardiac activity. (*Centralblatt für Chirurgie*, 36, 1884.)

Chronic Interstitial Nephritis and Endarteritis Obliterans.—Dr. Lemcke, of Rostock, after a general statement of the controversy as to which of the two affections is the primary, gives a detailed history of the case of a woman who was under observation for two years and a half in Thierfelder's Clinic, in Rostock. The woman was forty years old, and came to the Clinic on January 6, 1880, with the history of good health until one year previously, when she began to have a cough, palpitations of the heart, and diarrhœa. Six months afterwards she began to suffer with dyspnœa, loss of appetite, chilly feelings, and great thirst. The cardiac palpitations were frequent and severe, and now and then she had severe headache. The menstrual function was regular, and there was no syphilitic, gouty, or rheumatic history. When admitted to the hospital the patient had a slightly cyanotic appearance, and the lips and mucous membranes were pale. There was nothing abnormal about the lungs. The first sound of the heart was somewhat dull at the apex, and diffuse; there was a slight systolic murmur over the aortic orifice, both aortic sounds being strengthened. The first sound was heard in the carotid. The liver and spleen were normal. The urine was pale, reaction neutral, and contained quite a number of white blood-corpuscles, but no cylinders. On boiling it showed a slight cloudiness, which disappeared on the addition of acid; on the addition of large quantities of acid an intense cloud—opalescent cloud—appeared. The pupils on either side were of normal width, and reacted to light normally. The papilla on each side was slightly cloudy, and a good deal reddened; the veins were full and tortuous. On either side there were small hæmorrhages in the region of macula lutea; on the left there were a few, on the right a good many, small, white, shiny spots and streaks. During the two years and a-half in which the patient was under observation the symptoms were as follows: *Fever*—Fever was present only during a few days in February 1880, when she had bronchitis in April, and under circumstances to be described further on. *Pulse*—The frequency of the pulse was somewhat increased during the whole course of the disease, ranging between 90 and 104; it was tense and incompressible. The heart changes slowly but certainly went on, though after a time the patient did not complain of the pain, palpitations, and dyspnœa as at first; but it should be remarked that in the second half of her illness, as the psychical troubles became more pronounced, her sensations could not be depended upon. The aortic sounds became louder, until they assumed a loud, flapping character. The area of cardiac dulness gradually extended, and the apex beat changed from the fourth interspace in 1880 to the sixth in 1881; and in June 1882, it was found in the seventh interspace, in the mid-axillary line. At this time the superficial arteries felt like tense cords, and could be seen to pulsate over the chest, back, and extremities. There were no symptoms of disease of the liver or spleen during the whole course of the illness. *The Urine*—There was seldom less than 1000 ccm. of urine, with a specific gravity of 1010, and often 3000 ccm., with a specific gravity of 1008, in twenty-four hours. There was a considerable difference in the quantity, the specific gravity, and the proportion of albumen of the day and night urine. On one or two occasions the albumen disappeared from the urine entirely, but soon reappeared. In May 1882, it became cloudy, contained a large amount of albumen, and microscopic examination showed numbers of white corpuscles, epithelium-plates, and hyaline cylinders. This continued until death. *Anasarca*—There was a small amount of œdema when the patient first came under treatment; six months afterwards, as the albumen became more abundant and the quantity of urine decreased, the œdema was considerable. This disappeared on the administration of diuretics, and only reappeared once. There were no special symptoms on the part of the digestive apparatus. *Ophthalmoscopic appearances*—These were often noticed, and showed venous hyperæmia, increase of the white spots, numerous fresh hæmorrhages, and pigmentation. *Skin*—Petechiæ were several times seen on the skin, and in July 1882, hæmorrhage from the gums took place, lasting a whole day. The skin itself, which was pale at first, became later of a brownish bleached colour, was very dry, and did not perspire. Pruritus also appeared soon after her admission, and again two weeks before death. *Nervous system*—Besides frontal headache, hemicrania, and general headache, the symptoms on the part of the central nervous system were of great importance, first making their appearance in October 1880, under the form of slight psychical alterations of vision, and then gradually becoming so marked as to predominate over all the other symptoms. They were mainly shown by troubles of speech, of the general senses, of locomotion, and later by paralyses and contractures, and troubles of deglutition. Cheyne-Stokes's respiration finally appeared, then opisthotonos, and the patient died comatose in July 1882.

Autopsy.—The points of special interest noticed at the autopsy were the following: The arteries at the base of the brain were very thick and tortuous. The white substance of the brain contained a great number of small cysts, filled with a cloudy-looking fluid. Both lenticular bodies and the optic thalamus, as well as the pons, contained cysts, as did a part of the medulla beneath the fourth ventricle. The heart was very much enlarged, and especially long. The walls of the left ventricle were very thick, though the ventricle was not dilated; the right ventricle was not dilated, the valves were normal, and the walls were not thickened. The entire aorta was very atheromatous, with chalky patches, and contained thrombi. The left kidney was of medium size, the capsule adherent, and the surface non-granular; section showed the cortex to be considerably diminished and the pyramidal substance of a mottled, greyish-red colour. The right kidney was much diminished in size, and the capsule was adherent over the greater part. The most important microscopic changes noted were those found in the walls of the blood-vessels. These changes were present in all the vessels. Atheroma in all its forms and stages was found in the large vessels; in the smaller vessels the thickening, even in the peripheral vessels of the skin, in the brain and cord, and in the kidneys and spleen, was so considerable as to be apparent to the naked eye. This thickening was found to a less extent in the hepatic vessels. More especial attention was paid to the microscopic examination of the meningeal and renal vessels. Lemcke gives the most minute details of the changes found in these vessels; it is sufficient to say that the clearest evidences of endarteritis were found in all the small arteries of the whole body.

It is of especial interest to know whether the interstitial nephritis and the extensive changes in the vessels stand in a causative relation to each other, or whether they both depend upon a third cause. It must be first stated that the vascular change, simple hypertrophy of the muscularis, which Johnson and Ewald declare to be characteristic of the contracted kidney, was not found in a single instance in this examination; on the contrary, the muscularis was atrophied, and the assertion that the changes in the vessels are secondary is not weakened. Furthermore, scarcely one of the symptoms which are recognised as belonging to chronic interstitial nephritis is missing from the clinical history of this case; yet in the left kidney there was no contraction, and not very marked contraction in the right. Certainly, the microscopic changes found in this case, taken in connexion with the clinical history, admit of no other interpretation than that the origin of the collection of changes in the kidneys is to be sought in the changes in the small arteries of the kidneys, and not in the epithelial structure or in the interstitial tissue. Whether this disease of the smaller vessels of the whole body was exclusively caused by the sclerosis of the larger vessels, or whether both are due to an unknown third cause, is a question yet to be answered, since atheroma may be present without endarteritis obliterans. But the case reported clearly proves that chronic interstitial nephritis must be taken in certain cases as a co-phenomenon of a general arterial disease; and in this case the considerable atheromatous changes, and the cretifaction in the large vessels, and the occurrence of endarteritis obliterans without cretifaction in the small vessels of the whole body, are especially noteworthy. (*Deutsches Archiv für klin. Med.* xxxv., 1, 2; *American Journal Medical of Sciences.*)

Periproctitis simulating Typhoid Fever.—Professor Lücke relates the case of a strong and healthy man who was struck on the abdomen with a pole, but without receiving any apparent injury. Two weeks later he was seized with typhoid symptoms, high fever, and diarrhœa. These were followed by tenesmus, bloody and then purulent discharges, a gangrenous piece of the rectum was passed, and soon the man died. At the autopsy there was found a perforation in the posterior wall of the rectum and a large fæcal abscess extending to the sacrum. There were no typhoid lesions in the intestinal canal, no caries of the sacrum or coccyx, and no apparent actinomycosis. The author believed that the affection was caused by a lodgment of the actinomycosis fungus in the folds of the rectum, giving rise to ulceration and abscess. The original fungus of actinomycosis can often not be found in abscesses of which it is the cause. (*Deutsche Medicinal-Zeitung,* August 21, 1884.)

Extracts from British and Foreign Journals.

Cocaine.—Dr. William Murrell writes as follows: The literature of this subject has already attained such extensive proportions that it is no easy matter to cope with it. Cocaine appears to have been first isolated and extracted from the leaves of the coca plant (*Erythroxylon coca*) by Niemann in 1860, although some would claim the honour for Gadeke. In 1862, Lossen discovered in the same leaves a second principle which was named hygrin, and was found to be of a volatile nature. The other constituents of the plant are ecgonin, coca-tannin, and a peculiar wax. It is said that the yield of cocaine from the leaves is not more than from 0·02 to 0·2 per cent. Cocaine has a bitterish taste, and crystallises in shining monoclinic prisms.[1] Its chemical formula is $C_{17}H_{21}NO_4$. It is soluble in 704 parts of water, and also dissolves readily in alcohol, chloroform, ether, oil of cloves, vaseline, and castor-oil. When treated with strong hydrochloric acid, it forms ecgonin. It unites with acids to form salts, the best known being the hydrochlorate, the citrate, the salicylate, the nitrate, the sulphate, the oxalate, and the tannate. The muriate or hydrochlorate is the salt in common use. It consists of small, white, needle-shaped crystals, which in some specimens are so minute that the powder appears to be amorphous. It has a peculiar characteristic odour, and is soluble in water (1 in 4) and in alcohol. It possesses antiseptic properties, a 5 per cent. aqueous solution delaying the putrefaction of meat for some days. The citrate occurs in the form of small white crystals, and is the salt best adapted for dental operations. Respecting the physiological action of the drug, it may be said that comparatively little is known. Niemann, as long ago as 1860, noted the fact that when applied to the tongue it produced anæsthesia. Schroff, in 1862, found that doses of 5 centigrammes administered to rabbits gave rise to disturbance of pulse and respiration, and also produced temporary mydriasis. Fronmüller, a year later, showed that doses of 3 to 33 centigrammes caused in man little or no disturbance. In 1874, Dr. Hughes Bennett[1] published his well-known experimental inquiry into the physiological actions of theine, caffeine, guaranine, cocaine, and theobromine, and demonstrated that cocaine exerted its influence chiefly on the sensory nerves, and was an anæsthetic. In 1876, Dr. Ott published a paper on cocaine, and showed that it dilated the pupil.[2] These observations, however, appear to have been forgotten; and although various preparations of coca have been largely employed as therapeutic agents, the active principle itself was rarely used, and its very existence was probably unknown to the majority of medical practitioners. Suddenly, however, the whole aspect of affairs was changed. On Sept. 15, 1884—a date long to be remembered in the annals of Therapeutics—Dr. Karl Koller, of Vienna, demonstrated through his friend Dr. Brettauer, of Trieste, at the Ophthalmological Congress at Heidelberg, the action of a solution of cocaine when applied to the eye [*Pract.* xxxiii. 455]. Dr. Koller, it appears, had long been aware that cocaine acted as a local anæsthetic to the larynx, and it occurred to him that similar results might be obtained if it were used for other mucous membranes. At the Heidelberg Clinic two drops of the solution were dropped into the eye of a patient experimentally, and in a few minutes it was noticed that the sensitiveness of the surface was below normal. A drop or two more and the anæsthesia was complete; a probe was pressed upon the cornea until its surface was indented, it was rubbed over the surface of the cornea, it was rubbed over the conjunctiva, a speculum was introduced and separated the lids, and they were stretched to their utmost, the conjunctiva was seized with a pair of forceps, and the globe was moved about in various directions, but there was no pain, and the patient declared that he experienced no inconvenience of any kind. Before the experiment the eye had been tested, and was shown to possess the normal sensitiveness; the other eye, which was not treated, remained in this respect perfectly normal. At first a 2 per cent. solution was used, but subsequently it was increased to 4 per cent. A knowledge of this wonderful discovery spread quickly, and in a few days there were hundreds of workers in the field which had been so suddenly opened to them. Cocaine was dropped into the eye, rubbed into the skin, applied to the larynx and pharynx, and even injected into the rectum and vagina. The price of the drug rose rapidly, and physicians were found only too pleased to pay half-a-crown a grain for the privilege of trying it. Every one seemed anxious to do something to associate his name, in however small a degree, with so momentous a discovery. The result has been the publication of a host of papers and articles, many of them displaying only too obviously the signs of haste and crude experimentation. Many of these productions are best left unnoticed, but there are several important papers which will well repay attention. Professor Agnew,[1] of New York, in recording his experience, says: "We have used the new agent in our clinic, at the College of Physicians and Surgeons, with most astonishing and satisfactory results. If its further use should prove to be equally satisfactory, we shall find that we possess an agent for the prevention of suffering in ophthalmic operations of inestimable value. It is difficult to avoid expressions of extreme enthusiasm in view of what we have to-day seen, and in view of what we may rationally expect from further applications of the agent." He gives details of six cases in which various operations on the eye were performed with no other anæsthetic than cocaine, the results in every case being most satisfactory. Professor Knapp, of New York,[2] as the result of observations made on himself and members of his family with a 4 per cent. solution, found that cocaine possesses well-marked mydriatic properties. The pupil begins to dilate in from ten to twenty minutes, increases slowly in size, attains its maximum in from thirty to forty-five minutes, and then slowly diminishes. The diminution of sensibility becomes manifest in about three minutes, increases for from ten to twenty minutes, then decreases, and is over in about half an hour. The range of accommodation is shortened, the near point being moved from the eye whilst the far point is stationary. Similar results have been obtained by Dr. William Oliver Moore,[2&3] Dr. James L. Minor,[3] Dr. E. O. Shakespeare,[2] Professor William Thomson,[2] and Dr. R. J. Levis,[4] of New York; by Dr. Bradford,[5] of Boston; by Mr. Cowell, Mr. Anderson Critchett, and Mr. Juler, of London,[6] and by Professor Gayet, of Lyons. Many of these gentlemen have performed important operations under its influence. Dr. St. John Roosa,[7] Dr. Semon,[8] Dr. Goodhart,[5] and other observers, have used it to produce anæsthesia of the larynx, pharynx, and other parts, and one and all declare that the effects are most remarkable. In many forms of ear-disease it has been found especially beneficial. Mr. Brock and Mr. Arkle,[1] of University College Hospital, London, have used it hypodermically in two minor operations, and speak well of it. In cases of supra-orbital neuralgia, a 10 or even a 20 per cent. solution in oil of cloves rubbed into the part affords almost immediate relief. There is no case of poisoning on record, and in one instance a gramme and a-half produced very little effect. There can be no doubt that it is a most useful remedy, and that it will prove of great value in the treatment of a large number of painful affections. (*London Med. Record*, Dec. 15, 1884.)

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[1] "The History and Properties of Cocaine."—*The Medical Record* (New York), Nov. 8, 1884. "Hydrochlorate of Cocaine, the New Local Anæsthetic."—*British Medical Journal*, Nov. 29, 1884. "Cocaine and its Salts," by E. Merck, Darmstadt, 1884. "Cocaine and its Salts," by William Martindale, London, 1884.

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[1] *Edinburgh Medical Journal*, vol. xix., 1873-4.

[2] *The Medical Record*, New York, 1876.

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[1] *The Medical Record*, New York, Oct. 18, 1884.
[2] *Medical Record*, Oct. 25th, 1884.
[3] *The Medical Record*, New York, Oct. 25 and Nov. 8, 1884.
[4] *The Medical Record*, New York, Oct. 18, 1884.
[5] *The Medical Record*, New York, Nov. 8, 1884.
[6] *British Medical Journal*, Dec. 6, 1884.
[7] *Boston Medical and Surgical Journal*, Nov. 6, 1884.
[8] *British Medical Journal*, Nov. 29, 1884.

Neutral Sulphate of Atropine in Acute Otitis of Children.—Since Dr. Gentilhomme made known about two years ago the good results obtained by the administration of atropine for catarrhal inflammations of the nose, several confirmatory observations have been published. The action of atropine is undoubtedly favourable in the greater number of cases; in some cases it is so energetic, even in doses of gr. $\frac{1}{130}$, that considerable dryness of the pharynx is caused, and deglutition rendered so difficult that the patient cannot swallow solids. These effects are particularly intense in patients who have a commencing pharyngitis sicca. Dr. C. Miot has prescribed the solution of atropine for a certain number of children who were often affected with intense rhinitis, and had, at the same time, an acute otitis on one side or the other. The atropine aborted the rhinitis and prevented the otitis. Miot has notes of over thirty cases in which this treatment was successful. (*Revue de Laryngologie, Otol., et de Rhinol.*, Aug. 1884.)

Treatment of Laryngismus Stridulus.—In a clinical lecture on this complication of rickets, Professor Widerhofer recommends traction of the tongue during the attack, to prevent closure of the glottis, or sprinkling cold water in the face. In the intervals he gives bromide of potassium, and regards this as almost a specific for these spasmodic attacks. The remedy must be given in rather large doses, four grains morning and evening, gradually increased to eight grains. In one or two days, he claims, the attacks will have wholly ceased to occur. (*Allgemeine Wiener medicinische Zeitung*, July 29, 1884.)

Administration of Chloroform Vapour and Air.—M. Paul Bert has lately published some exact observations with regard to his method of administering chloroform mixed with air as an anæsthetic. He finds that a mixture containing 8 per cent. of chloroform readily anæsthetises the dogs used in his experiments. If inhalation be maintained, death occurs during the third hour. With a mixture of 6 per cent. life is possible till the seventh hour of administration. The cause of death in such cases he believes to be narcosis of the sensory cells of the spinal cord. He has further observed that when anæsthesia is deep, chloroform ceases to be absorbed in any sensible degree, and continues unabsorbed until consciousness is partly restored. Taking everything into consideration, M. Bert considers that the mixture most suitable for operations on the human adult is one a little under 8 per cent. in strength, man being less affected by the drug than the dog, and being moreover but rarely exposed to operations of three hours' duration. (*Progrès médical*, June 28, July 12, 1884.)

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[1] *British Medical Journal*, Nov. 29, 1884.

Fibrin-peptone as an Artificial Food.—A preparation prescribed by M. Grehant has been used with benefit in several cases requiring artificial nourishment. It has the following composition:—

Pepsin	2	grammes.
Fibrin	100	,,
Water	1,000	,,
Hydrochloric acid	4	cubic centimetres.

M. Bouchereau has employed this preparation for insane patients, feeding by the mouth always, and has noted general improvement in health after a month or a month and a-half. M. Henninger has used it in enemata without causing local irritation. The excretion of urea under this method increased four to five grammes in the twenty-four hours. (*Progrès médical*, July 19, 1884.)

Ocular Symptoms in Multiple Sclerosis.—M. H. Perinaud has made a study of the ocular disturbances which arise in connexion with multiple sclerosis. These are apparent in the actions of the external ocular muscles, and of the iris, in the optic nerve, and the special visual elements. (1) *The muscles of the eyeball.*—Paralysis or paresis of the associated movements of both eyes is characteristic. The eye does not travel readily in different directions, and maintains its position with difficulty in any direction external to the horizontal antero-posterior line of vision. This defect is therefore especially evident in movements to the right or left, or in convergence for a near object. In the latter case there is some strabismus, in the former usually none that is of note, unless only one eye is affected. The movements of nystagmus show a tendency to restore the antero-posterior parallelism of the eyes. Diplopia, less marked in associated than in monocular paralysis, is frequently observed at the early stage of the disease, and often passes off after a month or two, perhaps in consequence of a remission of the disease, but more probably in virtue of some movement of compensation, for it is constant at a later period.

The nystagmus, though a paresic tremor dependent on central nervous incompetence, is not necessarily proportionate to the degree of paralysis, but has been observed in a marked degree when paralysis was but slight, and *vice versâ*. The association of loss of power in ocular muscles with sclerosis in a peripheral nerve, and the presence of ptosis as a symptom of multiple sclerosis (Charcot), have also been observed. (2) *The iris.*—Inequality of pupils during rest, equalised sometimes on movement, occurs in the early stage of this disease. Later, myosis predominates. There is still, however, further contraction on accommodation to distance or exposure to light, the latter feature contrasting with the Argyll-Robertson symptom of locomotor ataxy. The iris reflexes are apt to be exaggerated in multiple sclerosis, not impaired as in tabes, and M. Perinaud regards the myosis in the one case as due to contracture, in the other to paralysis of the mechanism acted on by the reflex stimulation of light. (3) *Optic nerve.*—Amblyopia of three varieties exists: (*a.*) Slow, moderate in degree, with slight colour-blindness, the field of vision being normal and the disc slightly pale. (*b.*) Rapid, well-marked but transient, with distinct colour-blindness, the field of vision variously altered, the disc blanched and remaining white in spite of improvement of vision. In both of these varieties the lesion is central and both eyes are affected at once. Their partial and variable character contrasts with the progressive and fatal atrophy of tabes. In neither of the former is blindness ever absolute. (*c.*) The most marked and most persistent form shows marked atrophy of the disc, no colour-blindness, the field of vision being irregularly encroached upon. It is monocular and due to sclerosis in the optic nerve itself. It is noteworthy that M. Charcot and his pupils have proved the possibility of enlarging the field of vision by appropriate treatment in this form of nervous disease. (*Progrès médical*, August 9, 1884.)

Extirpation of the Thyroid.—The experience of Kocher (*Arch. f. klin. Chir.* vol. 29), that the removal of the thyroid body was followed among other results by a condition resembling myxœdema has led to a series of experiments at Florence, by Dr. Francesco Colzi, of Florence, under the direction of Prof. Luciani. In many rabbits the thyroid was removed but no alteration was perceived. In dogs the operation, even though perfectly aseptic, proved fatal in a week or less. Violent dyspnœa came on within twenty-four hours of the operation, and tonic spasms followed all over so that the animals often fell down rigid. They were very weak, and swallowing seemed sometimes impossible, sometimes easy. Death came on occasionally with convulsions after symptoms of general paralysis. If only one lobe of the thyroid was cut out, or only one-half of each lobe, no serious injury ensued; in one case slight convulsions. If first one lobe was removed, and then after a short interval the other, death followed with dyspnœa and convulsions. A removal of the isthmus led in one case to no symptoms, and in another to slight convulsions and recovery. In one case all the arteries leading to the thyroid were tied, but no change was produced except a certain hoarseness in the bark. In a dog which was dying from complete extirpation of the thyroid transfusion with blood from another healthy dog twice completely arrested the morbid symptoms for two days. It would seem from these experiments as if a portion at least of the thyroid body were required to destroy some product of tissue change which accumulates in the blood and leads to convulsions analogous to those of uræmia. This bears very little upon Kocher's experiments, which, however, it must be remarked, were all on thyroids that had probably nearly lost their functions; it leads, however, to the conclusion that in operations on goître it will be well to proceed by removing something less than the whole gland, or by ligaturing its vessels. (*Lo Sperimentale*, July 1884.)

Prevention of Hernia after Laparotomy.—Finding that he had several cases of hernia in the site of an ovariotomy wound, Hagen-Torn set himself to discover, if possible, some mode of preventing such an occurrence. In one of his cases in which the incision being slightly curved had partly occupied the linea alba, and partly encroached on the rectus muscle, he found that a hernia protruded only through that portion of the cicatrix which occupied the site of the linea alba, whilst the other part remained firm. In four subsequent cases he has avoided the exact middle line and cut through the fibres of the rectus, without any disadvantage either during the operation from bleeding, or afterwards from delayed healing. In fact the cicatrices seemed much firmer, and so far resisted all attempts at hernial protrusions on the part of the intestines. Hagen-Torn, whilst readily admitting that his experience is so far neither large enough nor sufficiently long to enable him to solve the question, commends the problem to other operators, whom he requests to aid him in its solution. (*Centralb. f. Chirurgie*, No. 35, p. 577, 1884.)

Notes and Queries.

Hammam R'Irha.—Dr. T. D. Savill, who is now resident physician at Hammam R'Irha, writes as follows with reference to the remarks we made in the *Practitioner* for November, vol. xxxiii. page 336:—

"All the bedrooms have fire-places now, so there is no need for the calorifer. The drawing-room—a big room, of the coldness of which people so justly complained last winter—is now perfectly warmed without any fire (though one can be had if required) by having the piscines below, and warmth coming through the floor, but no vapour. I have repeatedly taken the temperature in the absence of a fire there, and found it uniformly 63° and 64° Fahr. when the external temperature was 55° or so. The two large piscines in the basement of the new establishment are completed and full of water, but as the cooling-room and baignoires are not quite finished I have advised M. Dufour not to open them just yet, and the others, though of course 200 yards away from the hotel, as they are in many bathing stations, really do very well if properly managed, and I see to that. M. Dufour has very wisely decided to reduce his terms to ten francs (north rooms) and twelve francs (south) per day to include déjeuner and dinner, and he is going to make great improvements in the food when people begin to come in numbers. The weather has been very nice, and temperature outdoors 55°-60° Fahr. or more. There has never been any cholera within 200 miles of this place, and there is no quarantine anywhere between London and here."

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Spinal Deformity in relation to Obstetrics. By A. H. Freeland Barbour, M.A., M.D., etc. Large 4to, pp. 35, with 37 plates, Edinburgh: W. and A. K. Johnston.

⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BAILLIÈRE, of King William Street, Charing Cross.

Department of Public Health.

THE RESULTS OF THE NOTIFICATION OF INFECTIOUS DISEASES.

(*Continued from* p. 480, vol. xxxiii.)

Bradford (Yorkshire).—Population, 183,032 in 1881. Compulsory powers adopted in 1881. Notification required—first, from medical practitioner in attendance, the certificate to be given to the occupier, who is responsible for its transmission to the sanitary authority; and, second, from occupier whether there is a medical man in attendance or not. Diseases to be notified—small-pox, scarlatina, diphtheria, typhus, enteric fever, and cholera.

When the answers were received in 1882 to the circular which was issued by the Local Government Board, and to which reference has already been made,[1] the Town Clerk of Bradford reported that the Act had come into operation on the 23rd of July, 1881, and that it had "worked most harmoniously with all parties and with undoubted advantage." According to the annual report for 1882, which was issued by Mr. Harris Butterfield, it is stated that a severe epidemic of scarlet fever had "fully tested the working of the powers which had been acquired;" that 655 cases of infectious disease had been reported, including small-pox 7, scarlet fever 407, typhus 2, enteric fever 190, and diphtheria 45; and it appears from another part of the report that all the cases of small-pox, 208 cases of scarlet fever or 51·1 per cent. of those reported, and 79 cases of enteric fever or 40·7 per cent. of those reported, had been isolated in the Bradford Fever Hospital. Only two out of the forty-five reported cases of diphtheria were removed to that institution, but it is explained that there is no special accommodation available there for that disease. Mr. Butterfield goes on to say :—

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[1] P. 469.

> "It is not only by the number of cases removed to the hospital that the benefit of compulsory notification of diseases must be estimated. Many cases were sufficiently well accommodated at home, and others were too ill to be disturbed. But, whether removed or not, the premises in which the disease occurred were thoroughly inspected, and all conditions prejudicial to health which could be abated were dealt with. A book is kept in which all cases are entered, with a column for the date of disinfection, which is thoroughly carried out at the termination of the disease. Instructions are given as to the preventive management of scarlet fever, and frequent visits are made by the Sanitary Inspector to see that isolation is maintained. Since the Act has been in operation I have had the inestimable advantage of the friendly co-operation of the medical practitioners of the borough. At first, as in all new machinery, there was a little friction, which was very soon remedied. At the present time I know of no medical man who is opposed to the working of the Act. This result I attribute to the fact that the duty of notification, so far as the practitioner is concerned, ceases when he has presented the householder with the certificate stating the nature of the disease. Although the practitioner has then fulfilled his legal obligations, yet in the majority of cases, either to oblige his patient, or to save time, or out of courtesy to myself, he incloses the certificate in a stamped and directed envelope (with which all medical men are provided) direct to the Sanitary Department. Many practitioners send their cases direct to the hospital without my intervention. So far as the public is concerned, I have every reason to believe that the Act is strongly approved of. It has had a great effect on people who were hitherto careless. Seeing the great importance attached by the authorities to the proper treatment of infection, they have amended their ways, and take much greater care than was formerly the case to prevent the spread of disease."

According to a paper which Mr. Butterfield read before the Yorkshire Association of Medical Officers of Health in March, 1882, it appears that as the result of a conference between a deputation from the Medico-Ethical Society of the borough and the Parliamentary Committee of the Corporation, the bill was somewhat modified before it passed into law. Several clauses were altogether erased ; relapsing fever was omitted from the list of diseases to be notified ; and whereas the bill originally provided that the fee of half-a-crown was to be paid only in respect of one case occurring in the same house within a period of thirty days, a fee for every case was agreed to. The paper continues as follows :—

> "It has been said that one effect of these Acts would be to prevent people from sending for medical advice on account of the liability to be sent to the fever hospital, or otherwise interfered with by the Medical Officer of Health.

"In only one instance have I had any evidence of this feeling, and in that case there was sufficient justification for alarm. I found the patient in the most infectious stage of scarlet fever quite uncontrolled, and residing in an overcrowded dirty house in a densely populated neighbourhood.

"It was one of the two cases since the passing of the Act for which I had to apply for a magistrate's order for removal to the hospital.

"Several cases of mild scarlet fever were not attended, but not on account of any fear of the consequences. Three parents who were summoned and fined for not reporting unattended cases of scarlet fever in their houses, alleged in defence that they were unaware of the existence of the Act.

"On the other hand, eleven persons instead of sending for a medical man, reported cases at once in order that they might obtain a recommendation to the hospital. So far as the great majority of the profession and the public are concerned, the Act has been carried out with much greater ease than I had anticipated.

"But new machinery cannot be expected to work without some friction. A few practitioners took exception, not to the notification, but to the action by which the notification was followed, and desired in the name of the Medico-Ethical Society, that the Medical Officer of Health should not ask to see the patient, that he should not express a different opinion as to the nature of the disease from that of the practitioner in attendance, and that he should not compel the removal of a patient to the hospital without consulting the medical attendant. These were all reasonable, if rather unnecessary, requests, and were readily acceded to. It is evident, however, that occasions of emergency may arise when duty to the public demands immediate action untrammelled by nice points of professional etiquette. But with ordinary tact and courtesy, I do not anticipate that any real difficulty or conflict will have to be encountered. On the contrary, I think the tendency of the Act will be to bring the Medical Officer of Health into closer alliance with his professional brethren, and by gaining their good will and confidence, secure their cordial co-operation in his efforts to check the spread of disease.

"The Act has been in operation too short a time to enable me to speak very confidently of positive results.

"It has been instrumental in limiting the extent and duration of a severe outbreak of scarlet fever.

". . . By its operation we were enabled to isolate imported cases of small-pox before other persons could be infected, and thus to avert any dangerous extension of the disease.

"The results hoped for and expected in the future are a more accurate knowledge, than is otherwise attainable, of the origin, incidence, and mode of propagation of the diseases included in the Act; a more perfect control over the spread of these diseases by the more general enforcement of isolation and disinfection; the prevention of outbreaks of enteric fever, scarlet fever, or diphtheria due to local causes, such as defective drainage or polluted milk supply, which without compulsory notification would not be suspected until several deaths had taken place.

"There is another effect of legislation to this end which is often overlooked, namely, the education of the public in the avoidance of infection. I have noticed since this Act came into operation a great diminution of the carelessness as to infectious disease, which was formerly so common. People are more willing to make use of the fever hospital, and those who have infectious disease in the house

> have a keener sense of responsibility. The fact that the existence of fever on the premises is known, and that other cases springing from it will also be reported, supplies a very strong motive for careful isolation."

Mr. Butterfield having resigned his appointment as Medical Officer of Health in Bradford, no report for the year 1883 has been issued.

Burnley (Lancashire).—Population 58,751 in 1881. The compulsory powers were not adopted until 1883, and there is as yet no information in any annual reports concerning them. A report was, however, issued by Dr. Airy, Medical Inspector to the Local Government Board, on August 6th, 1884, on the prevalence of "fever" in the borough, and this document gives but little promise that there will be, in the immediate future, any substantial gain as the result of the powers acquired. Thus, Dr. Airy writes :—

> "The means at command of the Sanitary Authority for dealing with infectious disease when it occurs are still imperfect. The registrar of births and deaths furnishes a weekly list of all deaths registered in the week, but does not give *immediate* information of deaths from infectious disease. Hitherto there has been no direct way for the Authority to learn of fresh cases of infectious disease. The Medical Officer of Health has been obliged to trust to indirect means of obtaining information. The Burnley Improvement Act, 1883, however, contains clauses providing, under a penalty of 40*s.*, for notification by the occupier, and by the medical attendant, of any case of infectious disease ; requiring the corporation to provide the necessary certificate forms ; and assigning to the medical practitioner (legally qualified) a fee of 2*s.* 6*d.* for every such certificate in private cases, or 1*s.* in public cases. Up to the time of my visit no steps had been taken by the corporation to put these powers in force ; no forms had been prepared ; and no notice had been given to the private medical practitioners in the town.
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> "The only provision that the Sanitary Authority have made for the isolation of infectious cases consists of a row of four two-floored cottages, originally built as labourers' cottages, by the side of one of the high roads out of Burnley to the north-east, immediately opposite the entrance gates of the Union workhouse. One of the end cottages is occupied by the caretaker, the remaining three have been thrown together by piercing the party walls on both floors, forming six separate wards, three above and three below, not large enough to contain properly more than one bed apiece. As the wards all communicate with each other, they cannot properly receive cases of different infectious diseases at the same time, though they furnish convenient separation of the sexes. This is very unsatisfactory provision for a population of 64,000. Practically it is only used for the poorest class. None who could avoid it would consent to be removed to so wretched a place. It is under the superintendence of the workhouse medical officer, and in position and reputation alike it might pass for a dependence of the workhouse rather than the isolation hospital of the borough. During the nine months, October, 1882, to June, 1883, embracing the period when typhoid fever was chiefly prevalent, fifteen cases of fever were removed to the fever hospital, of

whom five died. In the same time the number of deaths from fever that occurred elsewhere in the borough was thirty-eight, and the number of cases under treatment probably nearly ten times that number. It is evident therefore that the fever hospital was of no great service in dealing with the outbreak, though doubtless the part it played was useful as far as it went."

Burton-on-Trent (Staffordshire).—Population 39,288 in 1881. Compulsory powers adopted in 1878. Notification to be given by the medical practitioner; also by the occupier, but only when there is no medical man in attendance. The diseases to be notified are—small-pox, scarlatina, diphtheria, typhus, enteric fever, relapsing fever, and cholera. Unfortunately no printed annual reports are issued as regards this district, and the very meagre material supplied by the Town Clerk in answer to the circular of the Local Government Board, 1882, contains no information of value for the purposes under consideration.

Bury (Lancashire).—Population 52,213 in 1881. Compulsory powers adopted in 1882. Beyond the fact that certain hospital huts were erected in 1880 there is no information available as to action taken with regard to infectious diseases.

Chadderton (Lancashire).—Population 16,899 in 1881. Compulsory powers adopted in 1882. Printed reports do not appear to be issued, and no information is forthcoming.

(*To be continued.*)

DIPHTHERIA IN THE STATE OF MICHIGAN.

DIPHTHERIA has for some years past been causing an increasing mortality in the state of Michigan and, as in this country, it is not densely populated towns and cities that are most affected, but rather sparsely inhabited localities. In referring to this, Dr. Henry B. Baker, secretary to the State Board of Health, thinks that this result is partly due to the circumstance that in thinly-settled country districts, especially where the contagious nature of the disease is not thoroughly understood, it is often difficult to secure proper care of persons sick with diphtheria, and to avoid direct or indirect exposure of persons susceptible to the disease. This, however, would hardly account for the selection by the disease of the more rural parts of England for its most fatal spread, and it is probable that there are conditions of soil or otherwise which are favourable to the development of the infection in country districts and which are not so prevalent under the circumstances of town life. In connexion with the prevention of the disease, Dr. Baker draws attention to the fact that the urinary and other discharges from persons sick of diphtheria probably contain the specific poison, and that it is hence important to disinfect all discharges from persons sick with, or convalescent from, diphtheria.

With a view of collecting all the information available in the State concerning diphtheria, a Committee of the State Board consisting of Drs. Kellogg and Avery was appointed, and their report has been issued. The method adopted in the enquiry was very much the same as that followed by the Collective Investigation Committee of the British Medical Association; certain questions were addressed to a large number of medical practitioners, and the answers having been carefully examined by the committee, the latter draw up their conclusions in the form of a special report.

The following are some of the more important portions of that report:—

"*Nature of the Disease.*—The known facts respecting the ultimate nature of the disease, especially the interesting experimental investigation of Drs. Wood and Formad, seem to point almost irresistibly to the conclusion that the disease is due to the invasion of the system by a species of microscopic fungus known as *bacteria*, or by a morbific element so closely associated with the fungus as to be inseparable from it by physical means, and indiscernible in a distinct form by the most powerful microscope. The evidence afforded by the investigation referred to also justifies the conclusion that some of the phenomena of the disease may be due to the development, during the progress of the disease, of poisons in the body of the patient.

"There is still room for discussion of the question whether diphtheria is a local or constitutional disease. Observed facts seem to justify the conclusion that in the majority of cases the disease is primarily local in character, although it cannot be denied that cases occasionally occur in which the constitutional symptoms make their appearance before there is any marked local manifestation. In this connexion we would raise the query whether the mode in which the disease manifests itself is not determined to a considerable degree, at least in the majority of cases, by the manner of the introduction of the *materies morbi* into the system.

"*Causes of the Disease.*—The theory advanced by Oertel, Eberth, Heuter, Klebs, and other noted European investigators, and recently confirmed by the elaborate experiments of Drs. Wood and Formad, is that one of the species of vegetable fungus known as bacteria, in the form of micrococci, find their way into the system through various channels, setting up a series of morbific processes which result in the various phenomena observed in this disease. As the contagium or poison usually finds its way into the system through the medium of air or water, the upper air-passages, particularly the throat, are the most exposed to the influence of the poison of the disease, and hence, they most frequently exhibit its most characteristic features. Finding lodgment upon the mucous membrane at the upper fauces or other portions of the pharynx, the spores or micrococci of the bacterium soon begin a vigorous development. The growth of the bacteria results in inflammation and fibrinous exudation, by which the peculiar parchment-like membrane characteristic of the disease is produced. Continuing their development the bacteria find their way into the blood. Through this medium they soon infect the whole system, developing in the kidney and spleen and other internal organs in prodigious numbers, to such an extent, indeed, in severe cases, as to block up the capillaries and thus obstruct the circulation, and by interference with essential vital processes occasion death. While this process is going on the patient is continually throwing off by the breath, expectoration, urinary and fæcal excretions, great quantities of the bacteria which may communicate the disease to others.

"The variety of bacterium which is held to be the cause of diphtheria by most of those who believe in its bacterial origin, is one of the most common forms of bacteria which abound wherever decomposition is taking place, and are undoubtedly present in the air in greater or lesser numbers at all times. A drop of saliva or a small portion of fur from the tongue, placed under a microscope, shows the fungus present in the mouth in considerable quantities. This is true of healthy persons at all times. The most critical microscopic examination shows no difference between the common micrococcus and that of diphtheria, but experiments show that there is a marked difference in the activity of the micrococcus, according as it is obtained from a healthy mouth or the throat of a diphtheritic patient. When obtained from the latter source its growth is very much more rapid and vigorous, which leads to the conclusion drawn by Drs. Wood and Formad, that it exists in two states, the micrococcus of diphtheria being an active state of the same organism which is comparatively passive under the conditions in which it is ordinarily found. By artificial cultivation the active micrococcus of diphtheria is converted into a passive innocuous micrococcus, no longer capable of producing the disease, which would seem to be strong evidence of the identity of the two organisms.

"Facts also seem to suggest the belief that the common micrococcus may be stimulated into an active condition by the abnormal activity of the tissue elements of an inflamed throat in which it may find lodgment, so that the ordinary micrococcus may be converted into the diphtheritic micrococcus by a pharyngitis, the result of cold or some other accidental cause. Drs. Wood and Formad hold that the same change in the micrococcus may occur outside of the body as well as in the manner suggested.

"Dr. Formad presented to a member of the committee microphotographs of micrococci from diphtheritic material from a malignant case of the disease which occurred at Ludington, Mich., and of micrococci from a case of ordinary sore throat, between which no difference is discernible. Dr. Formad also stated that he had produced diphtheria with the characteristic membrane by inoculation with micrococci from a case of ordinary sore throat.

"This view of the nature of the disease explains very satisfactorily a large share at least of the sporadic or isolated cases of diphtheria which are generally observed to occur in connexion with bad sanitary conditions; and that there is an important relation between insanitary conditions and diphtheria is evident from the replies published in this paper. Many of the cases mentioned by correspondents show a connexion between the disease and various unhygienic conditions too evident to be doubted. The following is a list of the principal insanitary conditions mentioned by correspondents as giving rise to cases of diphtheria: damp houses, set low in ground; pig-sty near house and well; uncleanly habits; contaminated drinking-water; bad drainage; filthy hog-wallows in proximity to wells; cellar filled with water, and furniture covered with mould; sink connected with privy by drain pipe; sink drain passing through cellar and burst, discharging contents on floor near well: stagnant pond receiving drainage from barn-yard and vault; refuse matter from fruit-drying establishment; carelessness about disposal of refuse; cattle and horses kept under the same roof with people, only board partition between.

"*Contagiousness of Diphtheria.*—Whatever may be the ultimate cause of diphtheria there is no room for reasonable doubt that the immediate cause, in the majority of cases, is contagion. The degree of contagiousness is, however, variable, differing with the intensity of the disease. Drs. Wood and Formad record an interesting observation made by them which may be mentioned in this connexion; namely, that the activity of growth manifested by the micrococcus varies according to the severity or malignancy of the case from which the specimen is obtained. The fact that sporadic or isolated cases quite frequently occur does not militate against the fact of the contagiousness of the disease, since the same observation has been occasionally made respecting small-pox and other diseases, the contagiousness of which is well established. Neither, on the other hand, should it be claimed that since the cause of the disease is usually acquired by contagion this must always be the case. No such claim would be made for such diseases as erysipelas and puerperal fever, which are well known to be readily communicable, though capable of originating without contagion. It may be further remarked in this connexion that the proportion of sporadic cases to those which can be directly traced to contagion is very much greater than in small-pox and other diseases of this class. When a child has symptoms of measles or whooping cough, the mother usually knows where the little one was exposed. This is by no means so uniformly the case with diphtheria.

"*Modes of Diffusion of the Disease.*—The poison of diphtheria may be communicated in many ways and by a great variety of means. Among those by which communication is known to have taken place, the following may be mentioned:—

"1. The most frequent mode of communicating the disease is proximity to or contact with a person sick with the disease. The breath of a diphtheritic patient is heavily charged with the poison of the disease; hence the necessity for thorough and constant ventilation, to secure the removal of the poisonous emanations from the body and the lungs of the patient as rapidly as thrown off. Kissing a person sick with the disease is scarcely less dangerous than taking a dose of strychnia or arsenic.

"2. Contact with a person acting as attendant to a patient suffering with diphtheria, or who has been exposed by visiting such a patient.

"3. The personal or bed clothing of a patient.

"4. Articles used about the patient.

"5. The body of a person who has died with the disease.

"6. The diphtheritic membrane itself is a most virulent means of communicating the disease.

"7. The expectorated matters of a diphtheritic patient are scarcely less infectious than the false membrane, and should be received upon cloths and immediately burned.

"8. There is reason for believing that drinking-water may become the vehicle for the poison of diphtheria in a like manner as for that of typhoid fever, through contamination with infected excreta from cess-pools or privy-vaults.

"9. It is probable that the air of sewers may become contaminated by the diphtheritic poison when diphtheria is prevalent in a city, and may thus become a vehicle for the extension of the disease.

"10. Milk may also probably become infected through a contaminated water-supply. A number of epidemics were reported in England which were traced to the use of infected milk.

"11. It is known that the disease may be communicated from human beings to domestic animals in various ways, and there is reason for believing that the malady has also been communicated from domestic animals to persons.

"*Life of the Poison.*—The facts reported concerning the length of time the diphtheritic poison may retain its activity must be considered not alone, but in connexion with the theory held by the observer respecting the communicability of the disease. Those who regard diphtheria as a disease communicable only from person to person, either directly or indirectly, consider it a highly contagious malady and impute to its *materies morbi* a high degree of vitality. Cases are reported in which the disease was communicated by articles of clothing, the infection of which occurred many months, or even years, before. The experiments of Drs. Wood and Formad, however, show conclusively that either drying or putrefaction will, in a very short time, destroy the activity of the poison, as tested on rabbits and by cultivation. This is true even of portions of diphtheritic membrane, infected tissues, &c., which would naturally be supposed to be capable of retaining the activity of the poison fully as long as any other vehicle. It is impossible to reconcile the experimental facts with those reported by observers of the disease, and it is consequently at present impossible to determine with any degree of certainty the exact facts in relation to this point. Under the circumstances, the proper course to pursue is to regard the poison as being difficult to destroy, and possessed of great tenacity of life, which should lead to thoroughness in disinfection and avoidance of infected places which are not known to have been thoroughly disinfected.

"*Predisposing Influences.*—1. The unusual susceptibility of young children is a fact generally noted by observers of this disease. The period of greatest fatality seems to be between the ages of one to five years. The susceptibility to fatal diphtheria gradually decreases between the ages of five and ten and becomes rapidly less marked with each additional year of life.

"2. Many observers have noted that the disease is much more apt to attack a person suffering with an acute attack of catarrh of the throat than one who is in a healthy condition. This fact of course accords with the conclusion reached by Drs. Wood and Formad, that the inflammatory process may be a sufficient stimulus to develop the common micrococcus of the mouth into its active state in which it becomes capable of producing all the characteristic phenomena of diphtheria. It is probable that chronic pharyngeal disease by producing a hyperæmic and often raw condition of the mucous membrane of the throat also predisposes to this disease. With this conclusion accords the fact that epidemics of diphtheria are most likely to begin and prevail extensively at those seasons of the year when acute catarrhal difficulties are most likely to occur and chronic affections of the same sort are aggravated.

"3. The majority of careful observers hold that one attack exerts a protective influence against subsequent attacks of the same disease. If this be true, the fact that an individual had not previously suffered with the disease would increase his liability to it. So many instances of second and even third attacks are reported, however, it would not be proper at the present time to consider this point as thoroughly established. It would certainly be improper for an individual needlessly to expose himself to the disease with the hope that he would enjoy immunity from it in consequence of a previous attack.

"4. There can be no question that bad hygiene or unsanitary conditions produce a predisposition to diphtheria, at least to the endemic form of the disease. The influence of this cause is little or not at all noticeable during the prevalence of a severe epidemic, as at such times the disease usually acquires a degree of malignancy which gives to it a high degree of communicability, and a virulency sufficient to overpower and obscure all other causes. In recognising the influence of unsanitary conditions we do not necessarily endorse any theory of the disease, as the ultimate result will be the same whether we regard the influence to be a direct one giving rise to the essential elements of the disease, or indirect, by lowering the vital tone of the individual and thus increasing his susceptibility to the specific poison of the disease.

"*Period of Incubation.*—The length of time elapsing after the time of exposure and the onset of the disease is usually very short—sometimes only a few hours—more often three to ten days; but many instances are recorded in which an interval of several weeks has elapsed between the exposure and the attack.

"*Characteristics of the Disease.*—On this point nothing specially new has been developed by this enquiry, and it would be needless to repeat here the accurate descriptions of the disease which may be found in every standard work on medical practice. We would, however, reiterate the fact that the appearance of a false membrane in the throat cannot be regarded as the sole distinctive feature of this disease, and that during a general epidemic of diphtheria every case of sore throat must be looked upon with suspicion.

"*Disinfection.*—Probably nothing can be better recommended on this point than the directions which have been prepared and for several years widely circulated by the State Board of Health. We would, however, lay particular emphasis upon the necessity of thorough disinfection of the bodies of the patient and of the attendants, as well as of their clothing and of everything in contact or communication with the patient. For this purpose we would recommend, when the physician thinks it proper for the patient, a warm full or tub bath, accompanied by thorough shampooing with good soap, followed by sponging of the entire surface of the body with a solution of sulphate of zinc, two ounces to the gallon. We would also raise the query whether thorough disinfection before burial of the bodies of those who die from this disease, especially when the disease assumes a malignant type, is not a sanitary measure worthy of adoption. This suggestion would apply with still greater force to cases of other diseases still more fatal in character and not less easily communicated from person to person.

"*Relation of Diphtheria to other Diseases.*—While we cannot offer upon this point anything which may be said to be positively determined, there is little room left for doubt that there is some relation between this disease and the affection which has been long known as *true croup.* There is also some suspicion of a relationship between diphtheria and scarlet fever, and the experiments of Drs. Wood and Formad seem to indicate a community of origin between diphtheria, erysipelas, hospital gangrene, and other septic diseases. This phase of the subject affords an opportunity for future investigation and study, which promises very interesting results.

"J. H. KELLOGG,
"JOHN AVERY."

THE FEVER OF MALTA AND GIBRALTAR.

BY W. C. MACLEAN, M.D., C.B.,
Inspector-General.

I HAVE read with interest Dr. William Turner's paper, in the October number of the *Practitioner* for this year, on the form of fever which prevails in the above-named fortresses, and which, under the names of "Malta fever," "Rock fever," "Continued fever," have been long known to military and naval medical officers. In the Medical Division of the Royal Victoria Hospital, Netley, cases of this remarkable fever in all its many stages and sequelæ are constantly seen. On the arrival of the troops from Egypt a rare opportunity was afforded of observing a large number of invalids from all parts of the Mediterranean. We had at the same time men direct from Cyprus, who had never served either in Gibraltar, Malta, or Egypt, others who at one time or other in the course of their service had been quartered in all the above-named places, and a considerable number who went to Egypt direct, and returned to England without having landed at any of the intermediate places. The opportunity of carefully studying the various forms of fever presented in the persons of this large body of men was not neglected, and the result was, at my request, published by my colleague, Surgeon-Major, now Deputy Surgeon-General Veale, at that time Assistant Professor of Military Medicine in the Army Medical School. This officer's paper will be found in the *Army Medical Report* for the year 1879, and is, so far as my knowledge extends, the most complete and exhaustive account of the subject to be found in the annals of military medicine. It is to be regretted that the circulation of these reports is so restricted that the many valuable records, statistical, sanitary, medical and surgical, they contain are lost to the profession. The soldiers from Cyprus who had not served in Gibraltar, Malta, or Egypt, suffered from one or other of the forms of malarial fever; those who came direct from Egypt, without having been either at Gibraltar, Malta, or Cyprus, were landed at Netley in various stages of enteric fever, shown by me in the *Army Medical Report* for 1881, to be undistinguishable from the same disease so familiar to us in Europe. On the other hand, the invalids who had served in one or other of the two great Mediterranean garrisons arrived at Netley labouring under one or other of the many stages of that remarkable form of fever to which so many names have been applied, and to which, as Dr. Veale has observed, no place has been given in our nosology. To this fever, borrowing the term from American writers, I applied the name typho-malarial, under the impression that it is a hybrid, having two factors—a fæcal and a malarial. To this term Dr. Turner objects on the ground that there is no malaria in Gibraltar. If so, it is difficult to account for a fact, often observed by me, viz., that invalids from Gibraltar are often admitted at Netley with malarial fevers, who have never served in any other station. I am, however, by no means wedded to the term, and prefer Dr. Veale's, viz., *febris complicata* as implying no theory of causation.

I have carefully read Dr. Turner's report of his cases, and must be allowed to say it was not to cases such as his I gave the name of typho-malarial. Dr. Turner's cases in symptoms, temperature curve, duration, and morbid anatomy, were clearly enteric, pure and simple; the one respect in which they differed from the typhoid fever of England and the Continent was the greater proportional prevalence of rheumatism, an invariable sequel in almost every case of fever from Malta and Gibraltar that has come under my observation. My typho-malarial and Dr. Veale's *febris complicata* do not go on all fours with Dr. Turner's well-recorded cases, as any one may see who will refer to Dr. Veale's admirable report above referred to. If asked what is the strongest objection to the term malarial as applied to this fever, I would say that it consists in this, that in the treatment of this complicated affection, quinine gives only negative results at best. Perhaps one of the most notable things in this complex affection is its extraordinary duration; this, as Dr. Veale observes, "is to be counted in months rather than in days or weeks," and some of its sequelæ have been known to extend over two years. It often begins like a common ague, and in some cases seen by me it occasionally passes away with paroxysms not to be distinguished from that affection. It is distinctly remittent in form; with a comparatively low temperature in the morning, there is a rise of four or five degrees in the evening, ending in a copious and exhausting night-sweat. But the remarkable and distinguishing feature of this fever, with its duration already noted, is its extraordinary range of complications, which is almost endless, involving the digestive, locomotory, genito-urinary, integumentary, nervous, respiratory and circulatory systems, with, as Dr. Veale has shown, "disorders of the blood and blood-vessels," indicated by the occasional appearance of a wide range of hæmorrhages. If Dr. Turner will compare the above summary of phenomena, he will not fail to see that it was not to comparatively simple cases, such as he so well describes, that I applied the name to which he takes objection.

THE PRACTITIONER.

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Original Communications.

AN EXPERIMENTAL INVESTIGATION TO ASCERTAIN IN WHAT MANNER SOLUBLE OXALATES ARREST FUNCTION, AND SOME REMARKS ON THE ACTION OF POISONS AND THEIR ANTIDOTES.

BY SYDNEY RINGER, M.D.,
Professor of Medicine at University College, London.

SOLUBLE oxalates are strong and speedy poisons, and in these investigations I have endeavoured to ascertain in what manner they arrest function and destroy life.

I have elsewhere shown that a lime salt must be present in the circulation to sustain the contractility of the cardiac muscular tissue. Lacking lime,[1] any combination of the other inorganic substances occurring in the blood is insufficient to maintain the heart's contractility. Even a minute trace of a lime salt, as the bicarbonate, with a physiological quantity of potassium chloride and sodium chloride, will sustain the muscular contractility.

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[1] Ludwig, however, finds that the spontaneous contraction of the ventricle will persist for many hours when the ventricle is supplied with the following circulating mixture: sodium chloride, 0·5 per cent. solution, 100 c.c.; caustic potash ·002 grammes, and peptones ·003 grammes.

If this holds good in regard to the cardiac muscle, it probably applies to all muscular tissue. Moreover, I venture to suggest it applies also to all the tissues, so that by excluding lime from the circulating fluid it is probable that no function would be possible.

Any substance therefore capable of precipitating the whole or part of the lime from the blood will suspend or weaken the heart's contractility, and probably the muscular contractility generally, besides other functions, whilst the re-introduction of a lime salt will restore the suspended contractility and the functions in abeyance.

Oxalate of lime is extremely insoluble. It is slightly soluble in saline solutions, and I hope to show that when a soluble oxalate is added to the blood, it precipitates enough lime to weaken the heart's contractility, though enough oxalate of lime remains in solution to sustain weak contractions. I shall show also that oxalates are directly poisonous to the cardiac muscular tissue, for enough of them added to the blood will quite suspend the heart's contractility; but at this point the addition of lime renders the oxalates almost entirely insoluble, and contractility returns with the renewal of good contractions, provided enough lime be used to replace that precipitated by the oxalic acid.

The following experiments were made with the detached ventricle of the frog's heart tied on the perfusion cannula of a Roy's tonometer. By means of a syphon action, blood can thus be made to circulate through the detached ventricle, and its contractions are recorded on a revolving cylinder. The circulating fluid was made by dissolving dried bullock's blood in saline solution prepared with water supplied by the New River Company. This water contains a small quantity of carbonate of lime.

I added 1 c.c. of 5 per cent. solution of oxalate of ammonia to 100 c.c. of circulating blood-mixture. The ventricular contractions at once grew weaker, and contractility tested with strong induction shocks ceased in about sixteen minutes. I then diluted the blood with 100 c.c. of saline solution, and in another eight minutes added a second 100 c.c. of saline, but contractility failed to return. Then I added 4 c.c. of 1 per cent. solution of calcium chloride, and spontaneous contractions speedily returned, and growing stronger, became as good as at the beginning of the experiment.

On another occasion I suspended the cardiac coutractility by adding 4 c.c. of 2 per cent. solution of ammonium oxalate. After an interval of twenty-five minutes I added 6 c.c. of 1 per cent. solution of calcium chloride, and good spontaneous contractions quickly returned.

These experiments, then, show—

I. That oxalate of ammonia suspends the contractility of the cardiac muscle.

II. That dilution of the circulating fluid will not restore the contractility.

III. That the addition of a soluble lime salt to the circulation nullifies completely the effect of the oxalate of ammonia, and restores good contractions to the heart.

I then experimented to ascertain whether the suspension of contractility is due to the withdrawal of lime from the circulation, or is due to the poisonous action of oxalic acid on muscular tissue, or to both these causes combined.

I prepared solutions of calcium chloride and ammonium oxalate, calculated on their molecular weights. The calcium chloride solution contained 1·1 per cent., the ammonium oxalate 1·24 per cent.

Mr. Gerrard tested these solutions and found that 1 c.c. of the oxalate of ammonium solution did not precipitate quite all the lime from 1 c.c. of the lime solution, and that about one minim more of the oxalate of ammonium solution was required to precipitate the whole of the lime.

I then used an artificial circulating fluid, consisting of 200 c.c. saline solution (0·75 per cent.), 2 c.c. of 1 per cent. solution of sodium bicarbonate, 1·5 c.c. of 1 per cent. solution of potassium chloride, and 2 c.c. of 1·1 per cent. solution of calcium chloride.

I first took a tracing with blood mixture, and then replaced the blood with the solution just mentioned. After recording the character of the beats for a few minutes, I added 1 c.c. of the solution of oxalate of ammonium; this, though it weakened the contractions, did not arrest them. The result of several experiments shows us that the addition of enough oxalate of ammonium solution to combine with the whole of the lime reduces the strength of the contraction by one-third to one-half, and moreover that this weakening is immediately counteracted by the addition of calcium chloride to the circulating fluid.

It is obvious therefore that the saline solution dissolves sufficient oxalate of lime to sustain weak contractions in the cardiac muscle, and as a sufficient dose of ammonium oxalate arrests the ventricular contractions, it follows that oxalic acid exerts a direct poisonous action on the muscular tissue.

The addition of a soluble lime salt to the circulating fluid, sufficient to precipitate the oxalic acid and thus to render the salt innocuous, will, as we have seen, at once counteract the direct effect.

These experiments, then, point to the conclusion that in poisoning by oxalic acid, or by a soluble oxalate, lime does not act as an antidote only in the stomach, but manifests its effects in the blood and tissues, and further, that the addition of a soluble lime salt to the circulation will speedily and fully restore functional activity to a tissue in which function is completely in abeyance. It is obvious that in practice we should employ soluble salts of lime, like the chloride, in preference to the insoluble, and that in great weakness of the heart, transfusion with a fluid containing chloride of calcium might be a life-giving expedient.

I now point out some of the ways by which a substance may prove poisonous, and in which its antidote acts. A substance may destroy function and prove poisonous by withdrawing from the circulation a salt necessary to the carrying on of functional changes. Oxalic acid, we have just seen, greatly weakens the heart's contractions by withdrawing much lime from the blood. The antidote here is obviously lime, to replace that lost to the circulation, and so to enable the muscular tissue to contract. Again, a poison being operative only so long as it remains in solution, we can administer some salt to render the poison insoluble, and therefore harmless. In this manner lime is an antidote to oxalic acid or to any soluble oxalate, even in the blood or tissues, for the oxalate of lime is soluble only to a very minute extent, quite inadequate for the oxalic acid to influence the tissues. Soluble barium salts are poisonous, and arrest the ventricle in systole. Now I find in experiments with the detached ventricle that the addition to the circulating fluid of a solution of sodium sulphate will precipitate the whole of the barium, and the heart will speedily resume its normal contractility, even though the contractions had been suspended for an hour. The effect of the sodium sulphate is very rapid, and it produces a precipitation not only in the circulating fluid, but likewise in the tissues of the heart itself.

Barium salts, one would think, can prove poisonous only to the tissues at a distance from the digestive canal, after more than enough has been absorbed to combine with the whole of the sulphuric acid in the blood and tissues; and it is possible that part of the action of barium may be due to the withdrawal of sulphuric acid from these tissues. It has been suggested, moreover, that the precipitated barium sulphate may block the blood-vessels and produce embolism.

The foregoing are instances of the effects produced by rendering a substance in the circulation insoluble, and so inoperative. I now give instances of antagonism between substances both remaining in solution in the circulation. I shall first refer to what may be termed a physiological antagonism. The heart's normal action is entirely dependent on an antagonism between the lime and potassium salts in the circulation. Without the presence of a minute quantity of a calcium salt in the circulating fluid, the muscular substance of the heart cannot contract; the calcium salt, however, broadens the beat and greatly delays diastolic dilatation, and to such an extent that, whilst the heart beats with normal frequency, a second contraction would begin long before the cavities had dilated from the preceding contraction; hence the cavities would contain very little blood, and the circulation would become greatly lessened.

Now a potassium salt in physiological quantity antagonises this effect of calcium salts on the dilatation, and, indeed, greatly accelerates it, so that the dilatation is completed before the ensuing contraction begins. Here, then, we have a physiological antagonism affecting only one part of a function, that is, the relaxation after a muscular contraction, the contraction itself being in no wise affected; but if the quantity of potash salt is increased, then the antagonism involves the contraction likewise.

and this diminishes in proportion to the quantity of the potash salt till contraction itself is also prevented.

I next refer to the antagonism of substances acting toxically. Veratria affects the muscular substance of the heart much like lime. It prolongs the duration of the contraction considerably, rounding the top of the trace, and greatly delaying the dilatation following a systole. A dose of potash in excess of the physiological quantity in the blood completely obviates this effect. But the antagonism between veratria and potash is more complete, and extends to the contraction as well as to the relaxation and dilatation of the cardiac muscular tissue.

I added 1 c.c. of 0·2 per cent. solution of veratria to 100 c.c. of circulating fluid. This produced well-marked characteristic irregularity in the ventricular contraction. I then added 3 c.c. of 1 per cent. solution of potassium chloride, and this quite obviated the veratria effects and induced normal contractions. We have here, then, an instance of the circulating fluid containing a poisonous dose of veratria and a dose of potassium chloride greatly in excess of the physiological quantity, and yet, from their mutual antagonism, the ventricle is quite unaffected, and perfect normal beats occur.

I give another still more striking example of antagonism—the poisonous substances remaining in solution. I first took tracings of the ventricle supplied with 200 c.c. of circulating fluid. I then added 1 c.c. of 0·2 per cent. solution of veratria, which produced a well-marked veratria trace with extreme incoordination of the ventricular substance. I then added 5 c.c. of 1 per cent. solution of calcium chloride. This almost removed the irregularity, but greatly broadened each beat, causing much fusion of the beats. Another 5 c.c. of calcium chloride solution quite removed the irregularity, and still more broadened the trace of each beat. The trace had all the characters of one produced by a large quantity of lime chloride, and it would appear that the lime obviated most of the veratria effects, replacing the veratria action by its own. I then added 10 c.c. of 1 per cent. solution of potassium chloride, and produced an almost natural beat. Here, then, the circulating fluid contained three substances in marked toxic quantities, and yet these so antagonised each other that a normal action of the ventricle ensued.

The preceding are instances of the simultaneous administration of drugs with antagonistic physiological action, in which one drug antagonises the other.

I next come to an antagonism between two substances, which nevertheless affect a tissue in a similar way.

When two substances, each capable of inducing a similar change in a tissue, are both added to the circulation, the result of their conjoint action in one case is an antagonism; and in another case one substance reinforces the other, and their united influence produces an effect greatly in excess of the operation of one substance only.

For instance, lime and barium salts affect the cardiac muscular tissue in much the same way. Both broaden the beat and delay dilatation, but barium salts produce a greater alteration than calcium salts. When a soluble barium salt is added to a simple saline, and this is used as a circulating fluid, well-marked barium effects ensue; if to this is now added an equal molecular quantity of a soluble calcium salt, then, instead of an augmentation of the effects common to both ingredients, we get, indeed, a great diminution of these common effects—the lime seems, in fact, to displace the barium from its combination with the tissues, and consequently the lime effects replace the barium effects.

But in other instances the combined action of the two substances which affect the tissues similarly is greater than that of either substance singly. For instance, lime and veratria, which affect the muscular substance of the ventricle in much the same way, if added to saline solution, and this combination is used as the circulating fluid, the duration of the ventricular contraction and the long delay in dilatation is far greater than when either substance is used singly.

I venture to offer an explanation of this difference in the conjoint effect of two substances, each of which affects a tissue in a similar manner.

In a molecule some of the elements remain unsaturated, and with these unsaturated elements other substances can unite and in this way modify the constitution of the molecule. If two elements remain unsaturated, one substance may attach itself to one element, and another substance to another element. But it may happen that two substances affecting the molecule can attach themselves only to the same unsaturated element, and the substance having the stronger affinity will displace the weaker. These substances, like calcium and barium, chemically closely allied, will most probably have an affinity for the same element, and the stronger calcium will displace the weaker barium, and therefore this substitution of the effects of one substance for those of another similarly acting agent will be most likely to occur between substances having a close chemical similarity.

Other substances differing, *inter se,* widely in chemical nature, will attach themselves to different atoms at the same time, and hence the result on the molecule is the combined influence of both substances, as happens with lime and veratria.

Finally, there is another way by which the poisonous action of some substances may be greatly lessened.

Some substances appear to prevent the changes which take place in the exercise of a function, as, for instance, the contraction of muscle. They do not destroy the structure, they only suspend function, and this power they possess only when the poison reaches a certain percentage of the circulating fluid. If the fluid is diluted, then the percentage amount becoming less, the poisonous action is greatly reduced. This is the case with most salts, like potassium salts. If sufficient quantity is added to the circulating fluid to arrest the ventricle in systole, on adding to the circulating fluid an equal quantity of saline, function immediately returns with good spontaneous beats.

I have elsewhere drawn attention to this fact, and pointed out that in poisoning by such drugs one obvious way of lessening their poisonous action is to dilute the blood, either by directing the patient to drink freely of a saline fluid, or to inject a saline fluid containing a physiological quantity of a calcium and of a potassium salt into the circulation.

SHORT NOTES ON THERAPEUTICS.

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OCULAR THERAPEUTICS.

INDEPENDENTLY of the action of any particular drug, or the effects of any special operation on the eye, there are certain general indications to secure, which it is well to remind the reader of, and without attention to which all other treatment may be useless; these are: rest, pressure, counter-irritation, depletion, heat, and cold. I shall first say a few words on—*rest and pressure* combined with *counter-irritation.*

It is fourteen years since Mr. Furneaux Jordan wrote his work (*vide* review in *Practitioner,* vol. vi. p. 234) on "rest, pressure, and counter-irritation" in the treatment of inflammation. Since that date I have never treated a case of orchitis save on the plan then recommended by him, and have found it invariably successful. It so well instances the principle advocated that I may recall it to the recollection of my readers. Nitrate of silver solution (ʒi ad ℥i.) is applied at night to the affected testicle with a camel's hair pencil (the part having been previously shaved). Over this application is placed a linseed poultice, in which the testicle is suspended by means of a triangularly folded pocket-handkerchief in the usual fashion. The next morning the pigment of iodine (I use the following formula, iodine gr. xxx, mastich gr. xxx, spt. rect. ʒii, flexile collodion ʒii.) is painted, taking the shape of Scarpa's space for the extent of some six to eight inches, in the course of the femoral vessel ("adjacent vascular territory"). The nitrate of silver vesicates the scrotum. The poultice is continued for from twenty-four to forty-eight hours, when it is replaced by simple dressing and a suspensory bandage. In a few days the testicle, now reduced in size, and no longer sensitive, is strapped. Salines are given at first, and afterwards iodide of potassium. The patient can attend to business after a day or so. Perhaps there is no organ in the body to which we can so successfully apply these principles of treatment as the eye. Certainly, by whatever means we obtain it, rest—mechanical and physiological—should be our first aim in controlling by far the greater number of its affections.

In fact, if we enter, which I have not time to do, into the *modus operandi* of nearly all the important therapeutical measures resorted to in eye diseases we find that our ultimate object is to secure rest. When we prevent the friction of the eyelids on the globe by light strips of adhesive or isinglass plaster; when we relieve hyper-distension and diminish tension by means of mydriatics or myotics, by the use of pressure, by the application of leeches, by deep counter-irritation, by paracentesis of the cornea, by sclerotomy or iridectomy; when we relieve the blepharospasm of phlyctenular corneitis by section of the external palpebral ligament, relieving pressure and freeing the cornea from irritation; in the reduction of intra-ocular vascular tension by the subcutaneous injection of pilocarpine; and, most important instance, the enucleation of an injured or diseased globe in order to save the fellow eye from the reflex irritation which, I believe, is the cause of the sympathetic cyclitis and iritis, and which (not excluding a travelling neuritis), I believe to be the origin of the disease in many cases; in relieving the unrest of the eye by the employment of sedatives for the internal pain of such affections as iritis, corneal ulcer, and glaucoma; or in lessening the accommodative strain of a refractive fault such as myopia, hypermetropia or astigmatism by atropine and suitable lenses; when we protect the retina from the glare of sunlight or the ill-effects of artificial light by means of blue and smoke preservers; and in enforcing such precautions as avoidance of, "near work," "work by artificial light," "stooping occupations," "needlework," &c., in each and all of these steps we are aiming at securing a condition of rest. How often have I seen these first three measures give instant relief to the most severe pain of corneal ulcer, through the means of a minute paracentesis of the ulcer, the instillation of atropine or eserine, and the application of a properly applied compress bandage of Liebreich, and occasionally the introduction of a seton in the temple. Here are three simple steps within the immediate reach of any practitioner, yet how often does the neglect of these observances cost the loss of an eye! In like manner the good effects of pressure may be seen in cases of photophobia, in blepharospasm, Sæmisch's ulcer, and iritis. The eye is peculiarly an organ in which pain and unrest are convertible terms. Relief of pain means rest. Hence, if cocaine does all that is promised for it we may look to it as a most important aid in the treatment of eye affections.

In keeping the patient with a compress bandage applied in the dorsal decubitus when there is retinal effusion, perhaps a threatening detachment, we have also an admirable example of the benefit of rest and pressure combined. Strange how few practitioners learn to apply that simple thing, a compress bandage!—to pack carefully with cotton-wool the space at inner side of the orbit, and over a small piece of linen laid on the eye, placing the fine layers of cotton-wool, until an evenly adjusted compress is prepared for one or both eyes, laying over all a soft, yielding, or knitted bandage, and to a certain extent regulating the distributed pressure according to the feelings and tolerance of the patient. Many a time I have given a patient ease from the irritation of some superficial corneal abrasion or minute ulcer, or some tiny pustule of the lid margin, by simply laying some strips of adhesive plaster, about four centimetres long and half a centimetre wide, horizontally, over the closed upper eyelid, and placing vertically a few strips across these to fix the eyelid and prevent motion. This has been my dressing after cataract extraction for the last six years. It forms a perfect splint for the occasion, and keeps the eye quiet while it permits the free flow of all secretion. And in the simple matter of the introduction of a seton in the temple do we not occasionally see men fail who can do bold operations?

Some years since I saw permanent disfigurement caused by the introduction of setons over the mastoid processes in a young girl. The scars left had much the appearance of strumous cicatrices, not pleasant reminders of her eye troubles. At times they are put too far forward in the temples and leave here ugly scars. I have for several years used Bantock's non-absorbent silk for seton threads. The seton should be introduced far back under the hair (this being cut for the time), be of sufficient length, vessels and fascia being avoided, be carefully attended to by oiling and pulling subsequently, or the application of a light poultice, and be kept in for a sufficient length of time. Scissors, tenotome, and probe with an eye, are the only instruments required. I have a thorough belief in a seton thus applied as a most invaluable therapeutical step in chronic and obstinate corneal and iritic cases.

I have had to remove setons a few times for some phlegmonous inflammation which threatened. I have on only one occasion seen any unpleasant result follow from the wounding of the temporal vessel and fascia. I was then called by another to stay the swelling and hæmorrhage. But further than this I have never had any untoward consequences from a seton.

Blisters to the temples and behind the ear, kept open with pieces of d'Albespeyre's dressing (No. 2), are at times useful adjuncts. The Pigmentum Epispasticum is the cleanest and quickest. I am aware that many ridicule the use of vesication over the temple. Nor is blistering a favourite mode of treatment with me. Still I have too frequently seen immediate benefit follow from it to deny its utility. We see the advantage of counter-irritation in reflex photophobia where the blepharospasm is relieved by the application of iodine pigment over the orbicularis muscle in circular form, or by the application of the solid nitrate of silver to the skin of the upper eyelid and the production of an eschar in this situation. Though I have not seen much good follow its insertion, still others (Leber) have reported favourably of a seton in the neck in cases of optic nerve inflammation. Thus these few instances show the value of rest, and, when indicated, of pressure and counter-irritation.

But we have in *depletion* another invaluable means of controlling inflammations in the eye. In acute inflammations of the conjunctiva, in iritis, in anterior sclero-choroiditis, sclerotitis, and cyclitis, in gouty retinitis, leeching is of the greatest value. In the latter affection more particularly, Heurteloup's artificial leech may be substituted with benefit. Yet in practice it will occasionally be found that leeching near the eye serves to aggravate the inflammatory state by a reaction which sets in a little time after the leeches are removed. In such cases it is wiser not to repeat them.

It will be found that in chronic conjunctival, sclerotic, and iritic troubles the "occasional" leech, one or two applied every other night, has a good effect in checking and arresting the inflammation. In chemosed conditions of the conjunctiva, the loss of blood consequent upon incision of the external commissure reduces the swelling and effusion. In purulent ophthalmia, scarification of the swollen conjunctiva lessens the congestion and distension of the lid. And in cases of severe chronic granulations on the palpebral conjunctiva, I have frequently assisted other treatment by periodical linear scarification. After wounds of the conjunctiva and cornea, if pain sets in and inflammation threatens, the application of from four to eight leeches to the temple will often be followed by subsidence of the symptoms.

There remains but a word to be said on the influence of *heat* and *cold* judiciously applied in checking inflammatory action in the eye. Strange, how ignorance or neglect of the powerful effect of both of these simple therapeutic means of relieving pain, giving rest to an eye, and arresting inflammation, causes their misapplication on the one hand or forgetfulness of their use on the other. Poultices, which promote congestion and suppuration, are applied when our every effort should be used to restrain the tendency to either process. Cold is applied or persevered in when its application is useless or injurious. The soothing effect of heat is overlooked and the warm fomentation omitted when its sedative and relaxing effect is most needed. The advantage of cold, by means of iced water, or Leiter's tube, is forgotten just at the moment when the resort to it might relieve pain, arrest inflammation, and perhaps save the eye. In the outset we may, I think, safely say that the employment of heat must be regarded as a far more delicate question to decide than the use of cold. I do not here allude to mere tepid antiseptic or sedative lotions, but to warm compresses and poultices or fomentations. It is a two-edged weapon, and may rapidly induce suppuration. Poultices to eyes are things which, save perhaps in the case of hordeolum, or when there is panophthalmitis, and where suppuration has occurred, should be altogether discountenanced. In cases of corneal ulceration, heat must be cautiously applied, and its use regulated by the nature of the ulcer, its stage, its suppurative tendency, the condition of the cornea, and the relief afforded to the patient. As a general rule, the more indolent the corneal infiltration and stationary or non-vascular the ulcer, the more are warm compresses and fomentations indicated. Generally, I have found warm fomentations of service in phlyctenular and pustular conjunctivitis, in croupous conjunctivitis, in chronic granulations, in pannus, in fascicular and interstitial keratitis, in non-vascular and indolent semicircular ulcers of the cornea, in Sæmisch's ulcer, after the removal of foreign bodies from the eye, in the early stages of iritis. On the other hand, cold, I believe, is indicated in the early and acute stages of catarrhal, granular, follicular, purulent, and diphtheritic conjunctivitis, in certain painful peripheral ulcers of the cornea, after peritomy, in inflammation threatening after operations, in recent retinal extravasations. In many of these affections iced compresses may not be indicated, but the antiseptic solution (carbolic, boracic, or salicylic acid), or sedative (belladonna or opium or chamomile), may be used cold, and frequently renewed by either the patient or nurse. But when the full constringent or repressive effect of cold is demanded, the greatest care is necessary to continuously sustain the effect. This can only be achieved by uninterrupted attention to the patient. For some time I used the small, thin, rubber ice-bags of Liebreich, but I gave these up on account of their weight and the comparatively rapid heating of the iced water. Of late years I have used a small suspended vessel of iced water, with a narrow strip of lint for irrigation, covering the eye with another small layer of lint and protecting the pillow with a piece of waterproof and sponge. This only requires occasional looking after on the part of nurse and friend. I have used Leiter's tube with great success to relieve pain and to maintain cold, but its action is not so direct on the eye as it is on the brow and round the orbits. I am also in the habit of applying cold to the eye for various slight congestive conditions, after a manner I first learned years since from the late Soelberg Wells. This is by means of an extremely fine spray projected on the closed eyelids from a syphon douche. I used the one originally made for him by Mr. Pillischer, in which the rose-jet is made of brass with the finest needle-point apertures and the stream controlled by a stop-cock. Cold water is permitted to play on the eyes for a few minutes night and morning. At times I have it slightly medicated, a few grains of sulphocarbolate of zinc or boracic acid being added to the water. In hyperæmic states of the conjunctiva, after conjunctivitis, when the eye has been irritated by overwork, and especially near work done by the aid of gas-light or petroleum, so heating to the eye, and often persevered in when· there is defective visual power, the use of this simple douche gives the greatest relief.

(*To be continued.*)

RESEARCHES RELATING TO THE PATHOLOGY AND TREATMENT OF CHOLERA.

BY T. LAUDER BRUNTON, M.D., F.R.S., AND P. H. PYE-SMITH, M.D.

(*Continued from* p. 437, vol. xxxiii.)

Experiment 32.—Tannin. $2\frac{1}{2}$ c. c. of a saturated solution of magnesium sulphate containing 5 grains of tannin were injected into the middle loop.

On examination,

Middle loop contained 7 c. c. thick fluid with a granular sediment; no mucus. After filtration = 6 c. c.

Upper „ contained a tapeworm and a little fluid.

Lower „ „ 7·5 c. c.. after filtration = 5·5 c. c.

The fluid gave an abundant precipitate with HNO_3.

Mucous membrane :—

Middle loop slightly injected, with extensive submucous extravasation.

$\left.\begin{array}{l}\text{Upper ,,}\\ \text{Lower ,,}\end{array}\right\}$ pale.

Experiment 33.—Sulphate of zinc. $2\frac{1}{2}$ c. c. saturated solution of magnesium sulphate with 1 grain of zinc sulphate were injected into the middle loop.

On examination,

Middle loop contained 8 c. c. clear fluid; no mucus. It gave an abundant precipitate with HNO_3.

$\left.\begin{array}{l}\text{Upper ,,}\\ \text{Lower ,,}\end{array}\right\}$ empty.

Mucous membrane :—

Middle loop slightly injected.
Upper ,, } pale.
Lower ,,

Experiment 34.—Chloral hydrate. 2½ c. c. of a saturated solution of magnesium sulphate were injected into the middle loop, and after closure of the abdominal wound 15 grains (1 gramme) of chloral in 2 c. c. of water were injected subcutaneously. The cat weighed 4½ lbs.

On examination,

Middle loop contained 13½ c. c. of clear fluid with lumps of gelatinous mucus.
Upper ,, } empty.
Lower ,,

Mucous membrane :—

Middle loop pale, œdematous, covered with soft gelatinous mucus.
Upper ,, } both pale and swollen.
Lower ,,

Experiment 35.—Chloral hydrate. 2½ c. c. saturated solution of magnesium sulphate were injected into the middle loop, and as soon as the abdominal wound had been closed, 3 grains of hydrate of chloral in 30 minims of water were injected subcutaneously into the flank of the animal. It weighed 3½ lbs.

On examination,

Middle loop contained 11½ c. c. of clear fluid, with flakes of mucus.
Upper ,, } empty.
Lower ,,

Mucous membrane :—

Middle loop moderately injected and covered with mucus. The serous covering of this loop was much injected.
Upper ,, } pale.
Lower ,,

Experiment 36.—Acetate of morphia. 2½ c. c. of a saturated solution of magnesium sulphate were injected into the middle loop, and immediately after closure of the abdominal wound 1 grain of acetate of morphia in 2 c.c. of water was injected subcutaneously into the flank of the cat, which weighed 5 lbs.

On examination,

Middle loop contained 10·5 c. c. of turbid fluid, tinged with blood.
Upper „ a large tapeworm.
Lower „ empty.

Mucous membrane :—

Middle loop pale, covered with thin gelatinous mucus.
Upper „ } pale.
Lower „ }

TABLE II. *Exhibiting the Results of the Second Series of Experiments.*

Drugs injected.	Quantities.	Fluid found in Middle Loop.
1. Magnesium sulphate . . Atropia sulphate	2·5 c.c. 5 grains	15·5 c.c. turbid, blood-stained, = 8·5 c.c. after filtration.
2. Magnesium sulphate . . Iodide of methyl-atropia .	2·5 c.c. 5 grains	6 c.c. opalescent, albuminous, = 4·5 c.c. after filtration.
3. Magnesium sulphate . . Chloral	2·5 c.c. 5 grains	10 c.c. blood-stained, = 9 c.c. after filtration.
4. Magnesium sulphate . . Emetia	2·5 c.c. 1 grain	12·5 c.c. blood-stained mucus, = 10 c.c. after filtration.
5. Magnesium sulphate . . Morphia.	2·5 c.c. 2 grains	7·5 c.c. clear mucus, = 6·5 c.c. after filtration.
6. Magnesium sulphate . . Quinine sulphate	2·5 c.c. 5 grains	19 c.c. turbid fluid and thick mucus, = 7 c.c. after filtration.
7. Magnesium sulphate . . Tannin	2·5 c.c. 5 grains	7 c.c., = 6 c.c. after filtration.
8. Magnesium sulphate . . Zinc sulphate	2·5 c.c. 1 grain	8 c.c.
Subcutaneous injection of chloral, with injection of 2·5 c.c. magnesium sulphate into the loop in each case.		
9. Chloral	1 grain.	13·5 c.c. clear gelatinous mucus.
10. Chloral	·29 „	11·5 c.c. clear fluid, mucus.
11. Morphia acetate	·065 „	10·5 c.c. turbid, blood-stained.

Experiment 37.—Effect of ligature of the mesenteric veins. Three loops of intestine were isolated as usual, but nothing was injected into any of them. The veins passing along the mesentery from the middle loop were carefully isolated and ligatured.

On examination,

Middle loop contained 6·5 c. c. of coagulated blood.
Upper „ } empty.
Lower „ }

Mucous membrane and all the coats of the middle loop were intensely congested, the mucous membrane being more so than the other coats. There was very little mucus upon it.

Upper loop } pale.
Lower „ }

SERIES III.

Experiment 38.—Division of the mesenteric nerves. Three loops were isolated as usual. Nothing was injected, but the nerves passing along the mesentery to the middle one were carefully sought for and divided. No microscopic examination was made afterwards, however, and it is therefore uncertain whether all the filaments were divided or not. The animal weighed 5 lbs.

On examination,

Middle loop }
Upper „ } all empty.
Lower „ }

Mucous membrane :—

Middle loop }
Upper „ } all dry.
Lower „ }

Experiment 38 *a*.—This experiment was repeated on another animal with a similar result.

Experiment 38 *b*.—Division of the mesenteric nerves. Three loops of intestine were isolated by ligatures. In one of them the vessels were carefully isolated, and the nerves and remaining structures in the mesentery connected with the loop were divided.

On examination,

Operated loop contained 15 c. c. of fluid.
Other loops empty.

Mucous membrane :—

Operated loop somewhat congested.
Other loops normal.

Experiment 39.—Division of both splanchnics. The loops were isolated as usual; nothing was injected into any, but both splanchnic nerves were cut. The animal weighed 5½ lbs.

On examination, about four hours after the operation,

Middle loop }
Upper ,, } all empty.
Lower ,, }

Mucous membrane:—

Middle loop }
Upper ,, } all pale and contracted.
Lower ,, }

Experiment 40.—Extirpation of the upper two-thirds of right semilunar ganglion. Division of the right greater splanchnic.

On examination,

Duodenum } normal.
Jejunum }

Lower part of ileum closely contracted.

The loop of ileum 10 centims. long, which had been isolated, was empty.

The part of intestine above the loop was full.

The ,, ,, below ,, empty.

Experiment 41.—Excision of lower two-thirds of right semilunar ganglion. Splanchnics not divided. One loop of intestine was isolated.

On examination the intestines were found much contracted. Their diameter was only about half their normal one, and they were also contracted in the direction of their length.

The loop, originally 10 centims., had contracted to 5 centims. The whole intestine was empty.

Experiment 42.—Extirpation (complete) of right semilunar ganglion. In this operation the receptaculum chyli was wounded. The great splanchnic of the right side was divided in removing the ganglion; the lesser splanchnics were unhurt. The animal was in full digestion, and the lacteals and receptaculum were full of milky chyle. The cat was killed about four hours afterwards by a blow on the head.

On examination the whole intestine was normal as regards vascularity and contraction.

One loop of intestine (10 centims. long) had been isolated by ligatures at the time the ganglion was removed. It was situated thirty-five inches (89 centims.) from the pylorus and eighteen inches (45¾ centims.) from the ileo-cæcal valve. The loop was distended with fluid. On measurement this amounted to 13 c. c.

The intestine above the loop did not contain more than 12 c. c. of fluid, although it looked full. The intestine below the loop was empty. There was no worm in the loop. The mucous membrane of the loop was normal.

Experiment 43.—Extirpation of right semilunar ganglion. The right semilunar ganglion was excised as usual, and a loop of intestine 10 centims. long was isolated. On examination about four hours afterwards the whole intestine was normal as regards contraction and vascularity when the abdominal cavity was opened.

After the cavity was opened the intestines contracted; after division of the mesentery they again relaxed, the loop, originally 10 centims., contracting to 7·5 centims., and again relaxing to 10 centims.

The intestines above the loop were empty.

Loop was empty.

Intestines below the loop were full.

Mucous membrane of loop pale, covered with bile-stained mucus.

Experiment 44.—Extirpation of right semilunar ganglion. One loop of intestine isolated in the jejunum and another in the ileum, close to the ileo-cæcal valve.

On examination all the intestine was normal as regards both vascularity and state of contraction.

Jejunal loop } empty.
Iliac „ }

Experiment 45.—Extirpation of right semilunar ganglion. The ganglion in this case was reached from the inner side of kidney.

A loop of intestine isolated close to duodenum and another at ileo-cæcal valve.

On examination,

Duodenal loop } both empty.
Iliac „ }

There were some worms in the duodenal loop and none in the iliac. The latter was more contracted than the former.

Vascularity of intestine normal.

Experiment 46.—Extirpation of right semilunar ganglion. It was cut out from the inner side of the right kidney. One loop of intestine isolated close to the duodenum and another at the ileo-cæcal valve.

On examination,

Jejunal loop contained some worms, but was otherwise empty and dry.

Iliac loop contained ½ c. c. of fluid. Its mucous membrane was moist.

Experiment 47.—Excision of left semilunar ganglion and upper two-thirds of right ganglion. Section of both greater splanchnics.

On examination,

Duodenum natural.
Jejunum natural.
Ileum pale.

The mucous membrane of the isolated loop was moist and pale. The loop contained about ½ c. c. of fluid.

There were no *Tæniæ* nor *Ascarides* present.

Experiment 48.—Extirpation of both semilunar ganglia. Right semilunar was excised from the inside of the right kidney, and all the nerves attached to it were divided.

One loop of intestine was isolated close to the duodenum, and another near the ileo-cæcal valve.

On examination,

Duodenal loop contained 1 c. c. of fluid.
Iliac „ „ 4½ c. c. of pale opalescent fluid. It effervesced and coagulated with nitric acid.

Mucous membrane :—

Duodenal loop swollen, soft, pale.
Iliac „ pale.

Experiment 49.—Extirpation of both semilunar ganglia splanchnics on both sides divided, but some small branches of right great splanchnic not divided.

One loop isolated close to the duodenum and another close to the ileo-cæcal valve.

On examination, both loops empty.

Vascularity of intestines normal.

Experiment 50.—Extirpation of both semilunar ganglia. The right ganglion was reached from the inside of the right kidney.

One loop of intestine isolated at the upper end of the jejunum and another at the lower end of the ileum.

On examination the whole intestine looked large. Instead of the opposite sides lying flat against each other the intestine was round like a rope.

Jejunal loop contained 1 c. c. of fluid and some fæcal matter.

Iliac loop nearly empty.

Mucous membrane :—

Jejunal loop swollen.
Iliac „ pale, moist.

Experiment 51.—Excision of semilunar ganglia. Both semilunar ganglia were excised. One loop of jejunum near the duodenum was isolated. When the animal was killed about four hours afterwards, and the intestine examined, it was found to be normal.

The loop contained about 1 c. c. of fluid.

Experiment 52.—Extirpation of semilunar ganglia. Both semilunar ganglia were excised, and one piece of small intestine 10 c. c. long isolated. About four hours after the cat was killed by a blow on the head.

On examination the duodenum was normal.

The jejunum and ileum were shortened and thickened.

The loop, originally 10 centims. long, had shortened to 7·5 centims. On pressing any part of the jejunum or ileum strongly between the fingers the part contracted to half its former diameter, but there was no peristaltic propagation of the contraction. On cutting away the intestine from the mesentery it lengthened, the loop again becoming 10 centims. long. When any part of the intestine was now pressed after its separation from the mesentery, the contraction occurred most strongly at the point of pressure, but it was also propagated to the adjoining portions of intestine.

The mucous membrane of the whole intestine was moist and bile-stained.

The loop contained about 1 c. c. of clear fluid.

Experiment 53.—Excision of semilunar ganglia; division of splanchnics. The splanchnics, large and small, were divided on both sides, and both semilunar ganglia completely excised. Four hours afterwards the cat was killed by a blow on the head.

There was no hyperæmia of the intestine, which was, on the contrary, rather pale. The mucous membrane was pale and dry.

Experiment 54.—Excision of lower two-thirds of right semilunar ganglion; division of right splanchnic, with the exception of one or two small communicating branches with left splanchnic and branches to suprarenal capsule.

Two loops of intestine isolated, one at upper end of jejunum, and the other at the lower end of ileum.

On examination both loops were empty.

Mucous membrane in both normal in colour, dry, biliary matter covering its surface.

Experiment 55. — Excision of right semilunar ganglion; division of nerves passing from it around the blood-vessels. Three loops of intestine isolated—one at upper end of jejunum, one at ileo-cæcal valve, and one midway between the two.

On examination all the loops were empty. Mucous membrane normal in all.

Experiment 56.—Excision of the left semilunar ganglion and division of nerves passing from it around the vessels.

Three loops of intestine isolated—one at upper end of jejunum, one at ileo-cæcal valve, and one midway between the two.

On examination all the loops were empty. Mucous membrane normal in all.

All the loops were the same length when tied, viz. 10 centims.

On measurement,

Lower loop,	7·5	centims.
Middle „	10	„
Upper „	8·7	„

Experiment 57.—Division of left vagus at the diaphragm. Three loops isolated—one at the upper end of jejunum, one at the ileo-cæcal valve, and one midway between the two.

On examination the stomach was distended with food; contained little fluid. The duodenum appeared full, but on opening it, it was found to contain no fluid.

All the loops were empty.

On measurement,

Upper loop,	7·5	centims.
Middle „	8·7	„
Lower „	6·2	„

Second Report of the Committee appointed to investigate Intestinal Secretion. By DR. LAUDER BRUNTON *and* DR. PYE-SMITH. *(From the Report of the British Association for the Advancement of Science for* 1875).

THE experiments carried out by your Committee last year (*vide* p. 54 of Report for 1874) were directed, first, to ascertain the relative effect of various neutral salts locally applied to the small intestine; secondly, to determine the inhibitory action of drugs injected into the circulation in modifying the above effects; and thirdly, to ascertain the precise manner in which the intestinal secretion is affected by the nervous system. Referring to the Appendices to our last Report for the contributions your Committee were able to make towards the solution of the first two of these problems, our present investigations have concerned the question of the innervation of the small intestine with regard primarily to its secretion, but also to its nutrition, its blood supply, and its movements. We had already ascertained that the paralytic profuse secretion after division of the mesenteric nerves, which was first observed by Moreau in dogs and rabbits, also occurs in the case of cats.

It remained to ascertain the centre and the channel of the inhibitory influence which, according to the best-known analogy, that of the sub-maxillary gland, must be supposed to control, under normal conditions, the intraparietal vaso-motor and secretory ganglia of the small intestine.

Before relating our own experiments, we may shortly refer to the results obtained by previous observers.

The first facts we have been able to find which bear on the question were observed as long ago as 1853 by Ludwig and Haffter,[1] who ascertained that after dividing the great splanchnic nerves there was no important alteration in the intestinal secretion, although a slightly increased degree of moisture of the mucous membrane in the upper part of the small intestine could occasionally be remarked; nor were the peristaltic movements either stopped or accelerated.

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[1] Haffter, Henle u. Pfeuffer's Zeitsch. n. F. iv. 3. Samuel, Wien. med. Wochenschr. 30, 1856.

In 1856 Samuel published the results of experiments in which he had extirpated the solar plexus in dogs, cats, and rabbits. He observed diarrhœa in some cases; and after death (which usually occurred between 12 and 24 hours) found the upper part of the intestine hyperæmic, with occasional ecchymoses and shedding of epithelium. The lower half was unaffected; the mucous membrane moist throughout.

In the same year Pincus performed similar experiments on dogs, cats, and rabbits. He also found that after as complete destruction as possible of the solar plexus, the mucous membrane of the upper half of the small intestine was excessively hyperæmic, with extravasations of blood and ulcerations. This observer noticed that hyperæmia of the stomach and duodenum followed section of the vagi. On dividing the cord of the sympathetic on the right side in four places below the diaphragm, he found the mucous membrane of the stomach, small intestine, and cæcum very hyperæmic, with slight hæmorrhage and ulceration, and also extravasation of blood among the muscles of the right thigh. The same operation on the left side produced similar, but less marked effects. Lastly the abdominal gangliated cord was divided on both sides, and the solar plexus excised. Still more extensive hyperæmia, submucous ecchymoses, and hæmorrhage into the intestine, with "disappearance of whole pieces of mucous membrane," were the result. Unlike Samuel, Pincus did not observe any increased secretion whatever from the intestinal mucous membrane.

Budge, in 1860, found that extirpation of the semilunar ganglia in rabbits produced increased fluidity of the fæces in the cæcum and colon. No mention, however, is made of anything approaching to paralytic secretion in the small intestine.

In the same year Schiff also observed that, after extirpation of the solar plexus in two cats, the fæces appeared somewhat softer and moister than in healthy animals. He also found that application of an induced current to the divided splanchnics was followed by contraction of the vessels of the stomach and intestine, and anæmia of the chylopoietic viscera, including the spleen, which disappeared on removing the stimulus and returned on re-applying it.

Lastly, Adrian, after extirpation (which he admits to have been imperfect) of the solar plexus, found no alteration whatever in the vascularity, secretion, or movements of the intestine.

Last year your Committee satisfied themselves, by numerous experiments detailed in their report, that division of both right and left splanchnic nerves was unattended by hæmorrhage, hyperæmia, or excessive secretion of the intestine.

Messrs. Lewis and Cunningham, in their valuable report of researches on cholera, have confirmed these results in the case of dogs. The same observers found in three cases that excision of the left semilunar ganglion, in addition to division of the splanchnics, had no positive effect.

We have ourselves excised the right, the left, and both semilunar ganglia, with division of both splanchnics in each instance, in fourteen experiments, and in no case did we find ecchymoses or excessive secretion. The mucous membrane was frequently pale and dry, sometimes moist. In one instance alone, however, as much as 4½ cubic centimetres of pale opalescent fluid were found in a loop of the ileum 4 inches in length. In another case a loop of the ileum of the same length, 18 inches from the valve, contained 13 c.c. of fluid. The 35 inches between this loop and the pylorus only contained 12 c.c., and the mucous membrane throughout was normal. In this case the right semilunar ganglion had been completely removed, as was verified after death, but the left ganglion and splanchnic were uninjured. The animal was in full process of digestion, and the lacteals and receptaculum chyli were distended. It was killed four hours after the operation.

We have next repeated the experiments of other physiologists and have, like them, observed that section of both pneumogastric nerves has no effect upon intestinal secretion. Since division of the vagi in the neck of the cat involves section of the cervical sympathetic, it appeared to your Committee that it has been sufficiently demonstrated that the centre regulating the intestinal nerves does not lie in the ganglionic cord either in the neck or the thorax.

We therefore next endeavoured to ascertain the effect of destruction of the grey matter of the spinal cord, and with this object destroyed the cord from the sixth dorsal vertebra downwards, not only by means of a bougie passed down the vertebral canal, but also by complete removal of the laminæ of the vertebræ and excision of the cord entire. In numerous trials we found that this lesion had no effect upon the vascularity or secretion of the intestine; and even when the vagi were also divided and artificial respiration maintained, the result was negative.

Looking, therefore, to the complete character of the experiments which have been now carried out on the vagus, the splanchnics, and the spinal cord, it would appear to follow, by way of exclusion, that the regulating influence conveyed by the nerves divided in Moreau's experiments must arise from some of the ganglia of the great solar plexus.

That the excision of the semilunar ganglia, in our own hands as in those of other experimenters, has been often followed by a negative result is true; but in three cases we obtained good evidence of a consequent paralytic secretion; and the difficulty of this operation, as well as the varying number and irregular arrangement of the ganglia of the solar plexus in the cat, may not improbably explain the more numerous failures.

It might be supposed, however, that the non-appearance of a paralytic secretion from the intestine after destruction, apparently tolerably complete, of the solar plexus, while it occurs after division of the mesenteric nerves going to a single loop of intestine, might be due to the blood going to any one part being insufficient to supply the material for secretion; for in Moreau's experiment, the nerves going to a part of the intestine only are divided, and any relaxation of the vessels of that part which succeeds the operation will increase the supply of blood to the intestinal loop operated upon, as the vessels in the after parts still retain their normal tone, and the blood naturally flows in the direction of least resistance. When, however, the splanchnics, which are the chief vaso-motor nerves of the intestine, are cut, and the solar plexus destroyed, the vessels of the whole intestine become dilated and the flow of blood through every part languid.

Such an explanation appears all the more probable from the fact observed by Cyon and Aladoff that section of the vaso-motor nerves of the liver alone increased the flow of blood through the organ and produced diabetes, while section of these same fibres was not followed by this result if the intestinal vaso-motor nerves contained with them in the splanchnics were divided at the same time. The reason assigned is that in the former case the blood flowed easily through the dilated vessels of the liver, and a proportionately small quantity through those of the intestine; while in the latter, the vessels being all dilated, there was not sufficient pressure to keep up an active circulation anywhere. In order, then, to avoid this source of fallacy, your Committee repeated their experiments on the section of splanchnics and excision of the solar plexus, but at the same time ligatured the aorta between the mesenteric and renal arteries, so that the pressure in the vessels of the intestines might be maintained as nearly as possible normal. These experiments also yielded a negative result, so that the failure of the previous series cannot have been due to diminished supply of blood to the intestine.

Apart from paralytic secretion, a striking result thrice obtained by your Committee was the occurrence of extravasations of blood into the mucous membrane of a great part of the small intestine, and the exudation of a bloody fluid into its lumen, after simultaneous destruction of the solar plexus and of the lower part of the spinal cord (Nos. 18, 19, 20). Although Samuel and Pincus had noticed this after destruction of the solar plexus alone, your Committee only observed it once, under these conditions, in the case of the dog (No. 23); while ecchymoses and extravasations were absent in all other cases, even when they succeeded in obtaining a paralytic secretion of fluid. Nor did your Committee observe hæmorrhage in any case after destruction of the spinal cord and division of the splanchnics alone, even when this was accompanied by section of the vagi.

In three out of the six experiments, on the other hand, in which the solar plexus and spinal cord were simultaneously destroyed, extravasations occurred to a most remarkable extent (Nos. 18, 19, 20). In one at least of the others their absence might be accounted for by the weak condition of the circulation.

Another result, worthy of special notice, is the occurrence of vomiting in one animal after division of the vagus and splanchnic nerves on both sides.

While the problem which has baffled so many previous investigations cannot yet be considered as solved, your Committee hope that their experiments may be considered to have proved the absence of influence on the intestinal secretion through the splanchnic nerves, the pneumogastrics, the sympathetic above the diaphragm, or the spinal marrow, and the probable influence of the ganglia contained in the solar plexus, though certainly not of the two semilunar ganglia exclusively. Also the independent occurrence of hæmorrhage and of paralytic secretion appear to point to a separate nervous influence on the blood-vessels and the secreting structures of the intestine.

APPENDIX.

No. of Experiment.	Anæsthetic employed.	Lesion.	Hours.	Results.
1	Chloroform.	Cord divided between D vi and vii.	25 . . .	Small intestine empty. Mucous membrane pale and dry.
2	Ditto . . .	Cord divided as in 1, and destroyed by a wire down to L ii.	24 . . .	Intestine empty. Mucous membrane pale and moist in duodenum, which contained worms: elsewhere dry.
3	Ditto . . .	Laminæ removed from D vii to L iii, and cord removed. Part below destroyed by a wire.	23 . . .	Intestine empty. Mucous membrane dry, less anæmic. Duodenum contained worms.
4	Ditto . . .	Laminæ removed from D vii-x, and cord removed. Part below destroyed by a hot wire.	Died within about 2 hours.	Intestine empty and anæmic. Mucous membrane dry.
5	Ditto . . .	Both splanchnics cut. Cord divided at D vii or viii. Part below destroyed by a catgut bougie.	4	Intestine empty, not anæmic. Mucous membrane dry. Peristalsis active.
6	Ditto . . .	Both splanchnics cut. Both vagi cut. Tracheotomy.	3	Intestine empty. Mucous membrane dry. Peristalsis active. This cat vomited bilious fluid several times shortly before being killed.
7	Ditto . . .	Both splanchnics cut. Both vagi cut. Tracheotomy. Cord divided between D vi and vii, and destroyed below that point by a bougie.	3	Intestine empty. Hyperæmia of mucous membrane and peritoneum.
8	Ditto . . .	Both splanchnics cut. Aorta ligatured between sup. mesenteric and renal arteries. Cord divided and destroyed as in 7.	Died almost directly.	Intestine empty, tightly contracted. Mucous membrane dry.
9	Ditto . . .	Both splanchnics cut. Both vagi cut. Tracheotomy. Aorta ligatured between sup. mesenteric and renal arteries. Cord divided and destroyed as in 7.	1	Intestine emptied and contracted. Mucous membrane moist, with a little bile-stained fluid in lower part of ileum.

APPENDIX (*continued*).

No. of Experiment.	Anæsthetic employed.	Lesion.	Hours.	Results.
10	Chloroform.	Right splanchnic cut (artificial respiration).	Died immediately.	Lungs emphysematous, with patches of lobular grey hepatization.
11	Ditto . . .	Both splanchnics cut. Both vagi cut. Tracheotomy. Cord destroyed as in 7.	3	Hyperæmia of parietal and visceral peritoneum. Intestine empty. Mucous membrane injected, but dry.
12	Ditto . . .	Both splanchnics cut. Aorta ligatured above renal arteries.	2¼ . . .	Intestine contained a little fluid. Mucous membrane hyperæmic.
13	Ditto . . .	Right splanchnic cut. Left incompletely. Right and left vagi cut. Cord destroyed as in 7.	4	Intestine contained a small quantity of bile-stained fluid and some worms. Mucous membrane anæmic.
14	Ditto . . .	Both splanchnics cut. Both vagi cut. Aorta ligatured above renal arteries. Cord destroyed as in 7.	Died immediately.	General hyperæmia. Upper part of intestine empty, lower contained yellow liquid fæces.
15	Chloroform. Chloral, gr. xxx.	Three loops ligatured. Nerves to middle one cut. All its vessels but one artery and one vein ligatured.	4¼ . . .	Upper loop empty; mucous membrane dry. Lower loop empty; mucous membrane moist. Middle loop empty: two fluid drachms of a brownish liquid.
16	Chloral, gr. xxx.	Same operation as 15.	Died quickly after.	All the loops empty. Mucous membrane pale.
17	Chloroform.	Both semilunar ganglia completely removed. Cord destroyed as in 7. 4 inches of upper jejunum and 4 of lower ileum ligatured off.	3½ . . .	Intestine full. Above 1st loop (5 in.) 9 c.c. of bile-stained fluid. In 1st loop (6 in.) 1 c.c. turbid fluid. Between loops (31 in.) 22 or 23 c.c. turbid fluid. In lower loop (14 in.) 17½ c.c. turbid brown fluid. No worms. Mucous membrane generally pale.
18	Ditto . . .	Both semilunar ganglia removed. Cord destroyed as in 7. Loop (5½ inches) a foot below pylorus. Second (3½ inches) above valve.	4½ . . .	First loop (nearly 2 ft.) below pylorus) empty and contracted. Mucous membrane normal. Second looked full, but only contained a small quantity of moist fæces.

APPENDIX (*continued*).

No. of Experiment.	Anæsthetic employed.	Lesion.	Hours.	Results.
18	*continued*	(Both loops squeezed empty.)	4½ . . .	Between the loops intestines contained 30 c.c. of blood-stained fluid. Mucous membrane ecchymosed.
19	Ether and Chloroform.	Cord destroyed as in 7. Cotton-wool soaked in Tr. Ferri perchl. thrust down canal. Unusually abundant fluid in peritoneum. Both semilunar ganglia removed.	About 5.	Intestine empty. Mucous membrane pale, with patches of ecchymosis.
20	Ether . . .	Cord destroyed, as in 7. Unusually abundant fluid in peritoneum. Both semilunar ganglia removed.	About 4.	Intestine contained very little fluid. Mucous membrane ecchymosed.[1]
21	Ether . . .	Both splanchnics divided, and semilunar ganglia excised[2] (only an ordinary amount of fluid in the peritoneum). Cord divided and destroyed as in 7.	Died about 3 hours after operation.	Small intestine contained 27 c.c. of thin mucus. Mucous membrane very anæmic throughout.
22	Chloroform.	Cord exposed from 6th dorsal vertebra to Cauda Equina, and removed. Small intestine ligatured at cæcum, 6 in. above, and 12 in. above that. Both ganglia excised.	1 hour.	From pylorus to first ligature (12 in.) contained a little bile-stained thin mucus. Mucous membrane pale. Between the two ligatures (16 in.) the same: in neither enough to measure. From second ligature to cæcum appeared full; but on opening it there was only a little mucus and liquid fæces. Mucous membrane pale and moist.
23[3]	Ditto . . .	Right and left splanchnies divided, and the largest nerve divided in the root of the mesentery.	3	From 2 inches below pylorus down to ileo-cæcal valve mucous membrane intensely congested with hæmorrhage: covered with tenacious mucus.

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[1] Epithelium not granular. Surface shed more or less completely. Deeper layer perfect. Vessels of villi crowded with blood-corpuscles.

[2] About this time a great mortality occurred in cats under ether. Previously several had died from catarrh while under chloroform.

[3] In this experiment a dog was used; all those preceding were on cats.

Third Report of the Committee appointed to Investigate the Conditions of Intestinal Secretion and Movement, consisting of Dr. LAUDER BRUNTON, F.R.S., *and* Dr. PYE-SMITH. (*From the Report of the British Association for the Advancement of Science for* 1876).

THE first part of the task of your Committee respected the comparative effect on intestinal secretion of various salts locally applied, and the action of other drugs, either mingled with these or injected into the blood, in modifying their action. This was completed in our first Report, in which we gave an account of our experiments on the local action of purgative salts, and stated that atropia has not the same inhibitory effect on intestinal secretion which it has on that of the submaxillary gland.

Secondly, we ascertained last year that the same "paralytic" secretion which Moreau observed in dogs and rabbits occurs under similar conditions in cats; and, further, that this effect is not produced by division of the pneumogastric nerves and cervical sympathetic cord, nor by section of the splanchnics and spinal cord, and that all these sources of nervous supply may be cut off, and both semilunar ganglia extirpated, without paralytic secretion following. We ventured to anticipate that the inhibitory centre sought would be found in the smaller ganglia of the solar plexus. We had also noticed that hyperæmia or hæmorrhage of the intestinal mucous membrane does not follow either upon division of the splanchnics or upon extirpation of the lumbar portion of the spinal cord, but frequently occurs when both these operations have been performed together.

This year your Committee have succeeded in proving positively that the conclusion they had reached by the method of exclusion is correct, namely, that the paralytic secretion of Moreau may be produced by extirpation of the smaller ganglia of the solar plexus, including those which are found in the superior mesenteric plexus.

We have also ascertained that removal of these ganglia is rarely followed by hyperæmia or hæmorrhage of the intestinal mucous membrane.

Thirdly, turning to the last section of our investigation, the movements of the intestine, we have obtained fairly conclusive evidence that its peristaltic movement (in the cat) is unaffected by irritation of the distal end of the divided splanchnics, but is called forth by stimulation of their proximal part.

The conclusions, then, to which your Committee have been led may be thus summed up :—

1. Application of various soda and potash salts to the intestinal mucous membrane produces a more or less profuse secretion, that caused by sulphate of magnesia, acetate of potash, sulphate of soda, and tartrate of potash and soda being most abundant.

2. The presence (in the intestine or in the blood) of atropia, morphia, chloral, &c., does not prevent the above action of sulphate of magnesia.

3. The secretory nerves of the intestines have the small ganglia of the solar and superior mesenteric plexuses for their centres; hence secretion is unaffected by section of the splanchnics, the vagi, or the dorso-lumbar part of the cord.

4. Destruction of the lumbar part of the cord, after extirpation of the solar plexus, produces hæmorrhage or hyperæmia of the intestinal mucous membrane, which is absent after division of the splanchnics, destruction of the semilunar ganglia and solar plexus, or division of the mesenteric nerves themselves.

5. The splanchnic nerves are, as usually admitted, the vasomotor nerves of the intestines, but have no centrifugal fibres to their muscular coats, and can only indirectly affect them by diminishing their supply of blood.

6. The splanchnics are the afferent nerves which regulate peristalsis of the intestine, the efferent stimulus probably reaching its intraparietal ganglia through the lumbar cord and abdominal sympathetic.

The following are the details of the experiments made this year. With those described in our two preceding Reports, they make up a total of more than a hundred, as the basis of the above conclusions.

In the first series we continued and completed the experiments in our last Report, undertaken to ascertain the nervous centre, separation from which produces the "paralytic" secretion of Moreau. Starting from the negative results with which we concluded our research last year, it will be seen that, of the thirteen cases in which we removed the solar or the superior mesenteric plexus, paralytic secretion resulted abundantly in Nos. 1, 2, 3, and 13, where both were removed. The same effect was produced in Nos. 7, 8, and 10, where the splanchnics and semilunar ganglia were left intact, and only the smaller (inferior) ganglia of the solar plexus, with the superior mesenteric offset from it, were excised. In No. 5, and also in No. 14, the paralytic secretion was likewise present, though less abundant. In four cases (Nos. 4, 6, 9, and 11) there was little or none; but in three of these cases the dissection, by which we verified in each case the completeness of the lesion produced, showed that the plexus had only been torn away from the artery without complete excision of its ganglia; and in No. **11** the superior mesenteric plexus was simply cut across, so as to separate it from the semilunar ganglia and splanchnics, with the superior part of the solar plexus. Thus the negative results here, like those of last year's experiments, confirm our present conclusions. In No. 12 there was enough fluid found to fill the loop moderately, but the rest of the intestine was empty; dissection did not show any defect in the previous operation, nor had there been hæmorrhage, diarrhœa, or sickness. It will, however, be noted that in this experiment less time had elapsed than in any of the others (2 instead of 3½, 4, 5, or 6 hours); and this fact, taken with the observation of the most abundant secretion having followed the longest period between the excision of the plexus and the animal being killed (see No. 7), may perhaps explain the scanty secretion in this instance.

The concluding series of experiments are on a difficult subject, which has already engaged the attention of Ludwig and his pupils, of Lister, Pflüger, Wundt, Von Basch, and other distinguished physiologists. Whether we are justified in the conclusions which we have drawn we must wait for time to determine, and will only add that we are well aware of the many possible fallacies which attend the inquiry, as well as of the conflicting results of previous investigators.

P.S.—Since this Report was presented (Glasgow, 1876), one of us, who was fortunate in securing the requisite Certificate from the Home Office, has obtained fresh results confirming those of the second series of these experiments.—July, 1877.

APPENDIX.

SUMMARY OF EXPERIMENTS.[1]

FIRST SERIES.

No.	Lesion.	Hours.	Result.
1	Excision of both semilunar ganglia and of the superior mesenteric plexus. Two 4-inch loops ligatured at beginning of jejunum and at end of ileum.	5 . .	Upper loop empty; mucous membrane dry. Between the loops 20 c.c. of mucus and serum without bile or blood; mucous membrane moist. Lower loop contained a little of the same. Serous coat congested.
2	Same as 1. Superior mesenteric artery accidentally wounded and ligatured. Diarrhœa before end of operation. Loops empty before ligature.	4½ .	Cat vomited shortly before it was killed. Peritoneal congestion of intestines. Duodenum mucous membrane congested, hæmorrhage into the gut. Upper loop, 5 c.c. of pale opalescent fluid.[2] Between the loops 40 c.c. of similar but rather thicker fluid, with a few streaks of blood which was accidentally mixed with it. Lower loop, 8 c.c of thin glairy fluid. Mucous membrane congested throughout.
3[3]	Same as 1	4 . .	Upper loop, 8 c.c. of bile-stained fluid. Between loops, 45 c.c. of turbid fluid. Lower loop, 8 c.c. of clear glairy fluid. Mucous membrane normal.
4	Mesenteric plexus alone excised.	3–4 .	All the loops empty, except a tapeworm in the ileum. Mucous membrane pale. [On dissection, it was found that the operation had been very imperfectly performed, so that the greater part of the plexus was intact.]
5	Same as 4. Three 4-inch loops in jejunum: middle and lower ileum tied.	4 . .	Duodenum partly contracted, with some fluid contents. Upper loop, 7 c.c. of fluid. Middle, 5 c.c., with small tapeworm. Lower, 4 c.c. (darker) and a tapeworm. Intestine injected outside throughout; mucous membrane in upper loop injected, in the others normal.

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[1] The animals used throughout were cats, and the anæsthetic employed was chloroform.

[2] The laboratory assistant, who had been a soldier in India, remarked that this fluid was just like the rice-water stools he had seen in cholera epidemics.

[3] This cat was white, with grey eyes, and was deaf.

No.	Lesion.	Hours.	Result.
6	Same as 4	3½ .	Upper loop, tapeworm and round worms. Middle empty. Lower, tapeworms. Mucous membrane pale and bile-stained. [The superior mesenteric plexus was found to have been only detached without excision.]
7	Same as 4	6 . .	Upper loop, a little clear fluid. Between loops, 52 c.c. of yellowish, rather turbid and tenacious fluid. Lower empty. Mucous membrane pale. No worms. Serous coat injected.
8	Same as 4. Two loops tied; one in upper jejunum 8 in., the other in lower ileum 6 in.	5 . .	Upper loop, 21 c.c. of turbid and blood-stained fluid; tapeworm and round worms. Between loops, 28 c.c. of similar fluid; no worms. Lower loop, 22 c.c. of serous fluid; no worms. Mucous membrane pale throughout, and viscera anæmic.
9	Same as 4	4 . .	The whole intestine empty. Mucous membrane dry. One small tapeworm. Clot in peritoneum from oozing of a small vessel. [Some of the plexus was found only separated from the artery, but not destroyed.]
10	Same as 4. One loop tied in lower ileum 18 in. Lacteals full.	4 . .	Jejunum and upper ileum (25 in.), 27 c.c. yellow turbid fluid. Loop 45 c.c. same fluid. Mucous membrane rather pale. No worms. Congested externally, and serous effusion in peritoneum.
11	Superior mesenteric divided from the solar plexus, but no ganglia removed.	3 . .	Negative result.
12	Superior mesenteric plexus divided, and both semilunar ganglia excised.	2 . .	Only a few c.c. of glairy fluid in the loop.
13	Solar plexus excised. Superior mesenteric artery isolated by excision of its plexus. Three loops as in No. 5.	12 .	The cat was sick during the night, and passed mucous stools. After it was killed next morning there was no peritonitis found, but effusion of chyle from puncture of a lacteal during the operation. Upper loop filled with dark brown fluid. Middle the same, but not so abundant. Lower, as upper. Mucous membrane pale, œdematous, and covered with thin tenacious mucus. Two round worms and a tapeworm.

SECOND SERIES.

14.—Cat under chloroform. Abdomen opened, and intestines exposed for 5 or 6 minutes to the air. No movement. The interrupted current from DuBois Reymond's induction-coil was used in this and the succeeding experiments. Electrodes placed under *left splanchnic.* Secondary coil at 25, no effect; at 15, doubtful; at 10, rapid anæmia of stomach and small intestines and of a large mesenteric gland. No movement Coil at 7: continued anæmia, which now extended to the kidneys; no movement; after removal of the irritation, the anæmia continued and even increased for a short time in the intestines, the kidneys recovering their normal vascularity more quickly.

After the intestines had regained their normal vascularity, the coil was put at 5, and the *left splanchnic* again irritated for 5 minutes. The effect was the same, but much less decided than before. After the current was stopped, the intestines became rapidly hyperæmic. The irritation once more applied with the coil at 0, anæmia only ensued after 30 seconds. No movement of the intestines. Ten minutes later the current was applied to the *right splanchnic* with the secondary coil at 25: no effect. Coil moved to 15: anæmia of stomach and intestines; slight movement, which had begun before the first irritation, now ceased. Current stopped: normal vascularity recovered; peristalsis began again, and became rather active; ecchymosis apparent under the tunic of the right kidney.

Intestines at rest: vascularity normal. *Right splanchnic* irritated with coil at 10; after two minutes, anæmia of stomach and some coils of intestine. Moved to 5, the large arteries became evidently smaller, though the vascularity of the viscera was still only partially affected. After two minutes more no movement.

The *solar plexus,* including the semilunar ganglia, was now *excised,* and the *superior mesenteric artery isolated.* The intestines were somewhat hyperæmic, the kidneys normal, peristalsis rather active. An upper and lower loop of 8 in. each ligatured as before. Coil at 15: electrodes applied to both splanchnics so as to irritate them at the same time: no anæmia; movement slightly increased. Coil at 10: no anæmia: movement considerably increased. Coil at 5: active peristalsis of stomach and intestines, doubtful decrease of vascularity.

The *left splanchnic* was next divided, and the electrodes applied to its *proximal end,* with the coil at 25. The movements which were going on before continued active, while the coil was moved to 15, 10, and 5. Slight anæmia appeared with the coil at 15, and did not increase. After the current was stopped, the intestines continued their movements, and quickly recovered a normal or perhaps slightly excessive vascularity. Fresh irritation a few minutes later (of the proximal end of the left splanchnic) produced no change in vascularity or in movement of the intestine.

The cat died several hours later without having vomited. The greater part of the small intestine contained only a moderate quantity of fluid, but the lower loop was filled with serum and thick white mucus. No worms. On dissection the right semilunar ganglion and solar plexus adjacent were found to be imperfectly removed: otherwise the operation had succeeded.

15.—Cat under chloroform. Abdomen opened and electrodes put on the *left splanchnic,* with coil at 25: no peristalsis, moderate injection. Current on: at first apparent slight increase of vascularity, but when the coil was moved to 15, pallor, with contraction of the branches of the superior mesenteric artery, became marked. No movement of stomach or intestines took place.

16.—Cat chloroformed and put into a bath of ·75 per cent. salt solution at 90° to 100° F., with the trachea opened so as to allow of complete immersion.[1] After electrodes had been put on *both splanchnics,* with the intestines at rest and moderately injected, the current was put on with a commutator, so as to pass through both nerves at once with the coil at 25, shifted after two minutes to 15, and then to 5 and to 0, but without visible effect.

17.—Cat chloroformed and abdomen opened. Intestines pale. Pregnant uterus. No peristalsis. *Both splanchnics divided. Proximal end* of *right* irritated, with the coil at 25. After two minutes the uterus began moving: on breaking the circuit this ceased gradually. The same occurred on applying the electrodes in the same way to the *left splanchnic*, the intestines still remaining motionless and their injection not varying. The narcosis was kept only moderately deep, the tail constantly moving. At every third or fourth expiration there was a strong contraction of the abdominal walls with relaxed diaphragm (effort at vomiting).

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[1] This precaution (in which we followed Sanders Ezn and Houckgeest) we found to be useless for the object in view, and do not recommend it to future investigators.

Electrodes were then applied to (the proximal end of) *both splanchnics*, and the current passed through both at once. Coil at 25: no change: intestines drawn out from abdomen so as to bring the greater part into view; they were motionless and moderately vascular. Coil at 15, current on: active peristalsis began, and soon spread to all the small intestines; the uterus also moved as before; vascularity of the viscera not altered. After three minutes the current was stopped, and the movements quickly ceased. Repeated with the coil at 5 and at 10 effect was produced, but general movements of the voluntary muscles ensued from escape of the current.

The animal was then placed in a bath of ·75 per cent. of salt solution at about 90° F., arranged so as to cover the abdomen but allow of respiration, and *both splanchnics* were irritated with the coil at 10: no effect.

Removed from bath: no movement. *Left splanchnic* (proximal end as before) irritated with coil at 15. After 30 seconds active peristalsis began in the colon, the uterus, and some folds of the small intestine. Moved to 10, peristalsis appeared in fresh folds, which ceased on stopping the current.

Electrodes on *right splanchnic:* coil at 15: no movement. Current on: after a few seconds active peristalsis began in the stomach, spread to the intestines, and by the end of the first minute all the small intestines were in movement, as well as the uterus, the colon not participating. Moved up to 10, increased activity of motion, the colon continuing quiet, and the vascularity of the viscera not affected, except as the tight contraction of the gut produced transient pallor. On stopping the current, peristalsis ceased within two minutes.

The electrodes were then applied to the *superior mesenteric plexus*, which was isolated for the purpose. Coil at 15, current on: slight movement occurred, but not constantly; the vascularity of the small intestine was distinctly, though only moderately diminished. Applied to the *renal plexus* no change was visible, but after removal the kidney increased in vascularity. Applied lastly to the nerves going to the *spleen*, that viscus shrunk from 5½ to 5 inches in length.

18.—Cat under chloroform. *Both splanchnics divided*, and *distal end* of *left* placed on electrodes, the intestines being anæmic and at rest. Coil at 25, current on: after 90 seconds there was very slight and limited peristalsis, but no other change. With the coil at 15 there was no movement, but the intestines were more vascular than before, which may, however, have been due to sponging with warm water to remove some blood.

Experiment repeated with the animal in the bath. There was then no change in vascularity, and no movement, except very slight peristalsis in a single coil. (This cat had suffered from hæmorrhage, owing to the liver being bruised in restoring it by artificial respiration. The fact was discovered after the animal was killed, and explained its feeble state during the experiments.)

19.—Cat chloroformed. *Both splanchnics divided.* Electrodes placed on *proximal end* of *left*, and the animal immersed in the bath at 100° F. There was at first active peristalsis, and after this had ceased, stimulation, with the coil at 25, produced no effect on the vascularity or movement of the intestines. Repeated out of the water there was still no movement, but the intestines became less vascular while the current passed, and then somewhat hyperæmic.

Stimulation of the proximal end of the *right splanchnic* out of the bath produced active peristalsis. The vascularity varied irregularly, and probably independently, with moderate injection after the current was stopped.

On the *left splanchnic* being again irritated after an interval (with the coil still at 25), peristalsis, which had become very languid, was distinctly increased. The intestines became pale during the strong contraction of each coil, but otherwise their vascularity was unaffected.

Stimulation of the *splenic plexus* reduced the length of the spleen from 3½ to 3¼ inches.

Reviews.

A Handbook of the Diseases of the Eye and their Treatment. By HENRY B. SWANZY, A.M., M.B., F.R.C.S., Surgeon to the National Eye and Ear Infirmary, Dublin, &c. Cr. 8vo. pp. 427. With Illustrations. London: H. K. Lewis. 1884.

THE appearance of another treatise on the diseases of the eye so soon after the publication of the works of Wolfe and Juler shows both the increasing numbers of those who are interested in this subject and the wide field it covers; each man feeling that there is something which his predecessors have omitted to teach, something which his special opportunities and observation have taught him to recognise and to treat better than they. Mr. Swanzy possesses all the qualifications for writing a good book on the diseases of the eye. A pupil and subsequently an assistant of von Graefe's, he early learned that progress can only be made by close and unremitting attention to nature; whilst he has for many years pursued the study of the diseases of the eye under very favourable conditions as surgeon to several important institutions in Dublin.

Mr. Swanzy states in his preface that the work is chiefly intended for students attending an ophthalmic hospital, though he trusts it may also be useful to practitioners; and he is of opinion that such handbooks should set forth the general feeling of the day on the subjects treated in their pages, rather than serve as a medium for the promulgation of the special views of the author. Hence he rarely puts forward his own opinions or practice very prominently, and when he does do so he endeavours to indicate other modes of dealing with the point under discussion.

The first three chapters are devoted to elementary optics, errors of refraction, and the ophthalmoscope, and we do not remember to have anywhere met with a better account, though extremely concise, of this important introduction to the study of ophthalmic surgery. Astigmatism is very well explained, and we recommend every student to master the chapter on retinoscopy.

We turned with much interest to see what practice was recommended by Mr. Swanzy in cases of glaucoma, a subject that must always strongly interest the ophthalmic surgeon, since on his decision and judgment the issues of good vision or total blindness often rest. First, then, in regard to iridectomy Mr. Swanzy observes that, long regarded as the sovereign remedy for the disease, it has even yet suffered but little from the competition of the proceeding termed sclerotomy. We are disposed to agree with him, and with him to admit that the more acute the form of glaucoma, and the earlier in the disease the iridectomy is performed, the more favourable is the prognosis in respect of the result. In regard to sclerotomy, Mr. Swanzy can say no more in its favour than that it has come to be cultivated as a method for the relief of glaucoma, and has proved useful as such. If any prolapse of the iris occur, it should be cut off with scissors, thus converting the sclerotomy into an iridectomy. No mention is made of trephining the sclerotic, perhaps because it is a dangerous proceeding. Eserine, he thinks, can only be adopted to a limited degree; the chief use of its application being in cases of acute glaucoma where it is desirable to postpone operation for a few days, and in cases of chronic simple glaucoma where it may be desired, if possible, to avoid any operative interference.

In regard to the operations for cataract extraction, Mr. Swanzy is very catholic, and abstains from stating which he habitually practises, if indeed he keeps to one method, and does not, like most ophthalmic surgeons, vary his method of operating with each case. His predilection, however, appears to be for the "three millimetre" operation.

There is a remarkably good chapter on the motions of the pupil in health and disease, which contains much information interesting alike to the physiologist and to the ophthalmic surgeon, and which must have cost Mr. Swanzy much time and trouble to weave; within the compass of about ten pages it contains most of the facts that are at present known and acknowledged on this interesting subject, and the bibliography of the subject is very large.

We have but few strictures to make in regard to this book. The chief one, perhaps, is that it is sometimes a little too brief, and here and there some additions might be made. Under myopia, for example, some notice should have been taken of what, in our experience, is not very unfrequent—the myopia of examinations. Mr. Swanzy, speaking of the new remedy, *Jequirity*, remarks that there is little or no danger connected with the use of the infusion, severe as the resulting inflammation seems to be. No one can, we think, read the various memoirs that have been published within the last year without perceiving that "unfortunate" cases, about which little is said, have occurred in the hands of several surgeons, and it could hardly be expected that violent suppuration can be set up in many eyes without the cornea suffering in some instances. Mr. Swanzy does not write as if he had often ventured upon using the remedy, though cases of granular lids are probably more common in Ireland than in England.

In some cases the disease is dismissed so curtly that there is no note of prognosis or treatment: for example, all that is said of primary syphilitic sores of the eye is that they are sometimes seen on the conjunctiva, usually on its palpebral portion near the margin of the lid, which conveys no useful information. Why does Mr. Swanzy write *dacruocystitis,* but still retain the *hry* in *lacrimal?*

It appears to us that this is one of the best treatises that has hitherto appeared on ophthalmic surgery, and it may be confidently recommended to both student and practitioner as giving an excellent epitome of the present state of our knowledge on this subject. It is printed in good type, on excellent paper, so that the illustrations are unusually clear and distinct. At the end of the book is a page in which coloured wools are inserted, illustrating Holmgren's tests for colour-blindness—a most useful adjunct.

Surgical Handicraft. By WALTER PYE, F.R.C.S., Surgeon to St. Mary's Hospital. London: Henry Kimpton. 1884.

THIS is the largest and best illustrated book we have seen on the subject of "surgical manipulations, minor surgery, and other matters connected with the work of house surgeons and dressers." The reader will find many methods given for the treatment of each fracture, the various ways of making and applying splints and all manner of retentive apparatus, illustrated with a large number of suitable pictures. A full account of the treatment of hæmorrhage and of dressing and draining wounds is given, with references to a convenient formulary at the end. There is a most excellent chapter on the administration of anæsthetics by Mr. Mills. The differences between chloroform and ether are fully set forth, and clear and careful instruction as to choice and mode of use enable the student to understand the advantages and disadvantages of the various anæsthetic drugs, whether given separately or in combination.

Having said so much, we must object to the useless little figures of trusses turned upside down, which can convey no knowledge to any one, and also to many of the digressions which tend simply to thicken the book. Thus in the account of the treatment of fractured patella it is stated that "mechanically it is not clear why two sesamoid bones in the quadriceps extensor tendon should do their work much worse than one, if only the intervening ligament be strong." We think the advantage of the single bone with its beautiful shifting leverage could be very easily proved to the author.

There are, moreover, far too many minor mistakes, some of them curious enough. We need notice only this: "*hair*-lip pins" is so printed three times on p. 222, and to bewilder the reader still further we are told "their name tells us when and where they are most commonly used."

The articles on surgical emergencies, especially that about poisons, are meagre in information, and ill-arranged for easy and rapid reference. A house surgeon of the present day should know much more, for instance, about carbolic acid poisoning than is to be found here. In spite of these defects, however, this book will take a useful place, and we venture to think it will often be found in the hands of practical surgeons.

Elements of Surgical Diagnosis. By A. PEARCE GOULD, M.S., M.B. Lond., F.R.C.S. Eng. London: Cassell and Co. 1884.

THIS excellent work will be read and welcomed by every student of surgery. It is thoroughly sound and good throughout, very well arranged in brief chapters, and so printed that reading is a pleasure, the type being so varied as to make the more important words in the page catch the eye as convenient landmarks.

A very good plan of the writer is the brief repetition of the description of each disorder affecting the various parts of the body, with a reference to a former page for further information. This is especially useful for learners, and in the discussion of rare disorders. For example, under the head of chronic swellings of bone we read, "If the enlargement of the bone occur in a man past middle life, be very chronic in its course, increase the length and diameter of the bone, affect many bones (skull, spine, clavicles, humerus, femur, tibia, etc.), and be attended with 'rheumatic' pains and a yielding of the long bones to pressure, this disease is that named by Sir James Paget *Osteitis deformans.*"

Again in the chapter on diseases of the head, when hypertrophy of the skull is described, "If at the same time or subsequently the long bones of the extremities become enlarged and curved, and the stature diminished, the disease will be recognised as *Osteitis deformans.*" Thus the learner is reminded and encouraged to recapitulate, to the great advantage of his memory. There is no repetition in the book which is not valuable and purposive; there is nothing left out; every disorder finds a place. We notice a clear account of that remarkable phenomenon "fat embolism," which occurs especially in comminuted fracture of the long bones. "After the shock has passed off, and generally in twenty-four hours to three days after the injury there are sudden symptoms of dyspnœa, rapid laboured respirations and increasing cyanosis although air enters the lungs freely, the pulse becomes frequent, irregular and weak, the action of the heart is turbulent, and if with this there is hæmoptysis, or fat be observed floating on the surface of the urine, the diagnosis of fat embolism must be made." Charcot's disease of the joints is described in connexion with *Arthritis deformans*, and under gangrene Raynaud's disease is mentioned; but these and other disorders are only described so far as is necessary for purposes of diagnosis. Most space is rightly given to those diseases and injuries which from their frequency or obscurity are most important to the surgeon. The remarks on the early stages of hip-disease are especially good; and several pages are devoted to the consideration of this malady; the value of flexion as a symptom is fully set forth, and the differential diagnosis discussed. In lateral curvature of the spine we are taught to look out for the evidences of rotation of the vertebræ, and not to be content with that feeble test the lateral deviation of the spinous processes.

The volume is suitably bound for the pocket in limp cloth. A few figures and outline diagrams for case-taking might profitably be added to the next edition.

Clinic of the Month.

Cocaine in Rectal Surgery and in Lithotrity.—Cocaine seems destined to play an important part in the treatment of painful affections of the rectum and genito-urinary system. Dr. Bettelheim of Vienna reports the case of a man, aged seventy-four, who had well-marked anginal attacks, the result of atheroma of the aorta and ossification of the coronary arteries. For some time he had, in addition, complained of rectal and vesical tenesmus. Percussion over the bladder showed that it was not dilated, and rectal examination demonstrated the fact that the prostate was much enlarged and probably the cause of the trouble. Cacao-butter suppositories were ordered, each containing half a grain of muriate of cocaine. One of these was introduced into the rectum at bedtime, and the patient slept well, and was not troubled during the night. The beneficial effects were apparent the whole of the following day. The suppository was not given that evening, and the patient passed an uncomfortable, restless night. The next day another suppository was ordered, and acted as well as the first. From the promptness and efficacy of the cocaine in this case, a brilliant future may be anticipated for the alkaloid in this department of surgery. It is now being largely used in many of the London hospitals in the treatment of piles, fissure, and fistula.

We understand that a lithotrity, with rapid evacuation of the fragments (Bigelow's operation), was performed under cocaine at the St. Peter's Hospital on Thursday last, with perfect success. The bladder was injected with half an ounce of a 4 per cent. solution of cocaine, and the operation was begun and completed *painlessly* in a quarter of an hour. (*Lancet*, Jan. 17, 1885.)

Subcutaneous Action of Cocaine.—M. Laborde has carried out a series of investigations into the action of cocaine by means of subcutaneous injection. He finds that besides a general and well-pronounced anæsthesia there is produced an excessive neuro-muscular excitability as evidenced by great restlessness on the part of the animal experimented on. Moreover the respiration is markedly affected. It becomes irregular and rapid, and after a toxic accumulation of the drug within the body is attained, death by asphyxia ensues. With regard to secretion, that of the submaxillary gland, unlike the condition when atropine is administered, is decidedly increased. Relying on the fact of the general anæsthesia produced by him in animals, M. Laborde suggests the use of cocaine in fractional doses as an internal remedy to allay the painful irritation of prurigo and other diseases of the skin in man. (*Progrès médical* Dec. 27, 1884.)

Ephemeral Œdema of Gouty Origin.—Negel, of Jassy, reports an interesting case of a lady, aged 40, strong and stout, who had been subjected to malarial influences, and who had complained at times of rheumatic pains, situated principally in the joints. She was, moreover, very nervous, but had never had any chilblains. She was liable to gastric attacks with vomiting, meteorism, and pain. Ten years ago, when bathing in a river, her whole body became swollen, and her skin itched violently. This accident did not recur till 1881. From that time whenever she washed her hands in water at the ordinary temperature, in from two to five minutes she felt frightful itching in the fingers, sharp pain, a sensation of burning and constriction, like a 'biting heat'; some minutes after, the fingers swelled, becoming red and shiny; the local temperature was a little raised. The swelling did not pit on pressure, but the redness disappeared, to return immediately. At the end of one to three hours all had passed away. According to her own statement, this same swelling might occur in the feet, arms, nose, ears, or any part of the body. It might occur also from cold air or contact with any cold body; the nose or ears were often attacked when she went out of doors. The urine was free from albumen and sugar. On the supposition that the phenomena depended upon gout, salicylate of sodium and liquor arsenicalis were prescribed, with two alkaline baths weekly. At the end of a month she was completely cured, the attacks no longer recurring under the influence of any of the above-mentioned causes. (*Le Progrès médical*, No. 43, 1884.)

Pemphigus of the Conjunctiva.—Steffan, of Frankfort, reports the following instance of this rare affection. A woman, aged 73, presented herself for treatment on account of an inflammation of the left eye. There was a moderate amount of conjunctival inflammation, with a peculiar cicatricial process running on in the inferior conjunctival sac. Some of the cilia of the lower lid were drawn inwards, thereby irritating the cornea. With continuance of the inflammation the inferior conjunctival sac became shallower, finally disappearing in the outer third. The cause of this cicatricial process could not then be discovered.

There was no evidence of granular conjunctivitis. The condition was evidently that described by Gräfe as *essential shrinkage of the conjunctiva*, and by Stellwag as *syndesmitis degenerativa.* The right eye then became inflamed, and the same cicatricial process began to develop in the inferior conjunctival sac. Finally scarce a trace of the sac remained, the lower lid being closely united to the ball. A month after the inception of the disease an eruption of typical pemphigus vesicles occurred, first on the left, then on the right eyelid. On the latter, during one and a half-years' observation, the vesicles would come and go. There also occurred during this time an affection of the throat which was diagnosed as pharyngeal pemphigus. Steffan draws the conclusion from his case that this confessedly obscure condition of conjunctival shrinkage is really the result of a pemphigus eruption, and that the proper name for the condition is pemphigus conjunctivæ. (*Klin. Monatsblätter*, Aug. 1884.)

Schweigger reports a case of the same kind. The patient was a robust old man. There was marked injection of the scleral conjunctiva of each eye, a partial shrinkage of the inferior palpebral conjunctiva, and disappearance of the inferior conjunctival sac, while the upper lids were healthy. A few months later a pemphigus vesicle developed itself on the right scleral conjunctiva. For years previous similar vesicles had been observed on the mucous membrane of the mouth. (*Centralblatt für prakt. Augenheilkunde*, June 1884.)

Vascular Origin of certain Scleroses.—The part which disease of the vessels plays in determining sclerosis in the spinal cord has not been as yet thoroughly settled. M. Martin in 1881 pointed out that there was an obliterative arteritis in the posterior columns in a case of tabes dorsalis, and attributed the spinal injury to that cause, and the same view of similar cases has been taken by Adamkiewicz and Babesiu. In more diffuse spinal scleroses it has also been noticed and considered as itself the result of old age or syphilis. M. E. Demange (of Nancy), details a long case of a woman of 75, in whom there was contracture of the legs and atrophy of the muscles of the calves, with much pain and cramp; the reflexes had disappeared; there was frequent vesical spasm, and she finally died with spasm in swallowing. A careful examination of the cord showed patches of sclerosis very irregularly distributed, which touched all the parts of the cord at one level or another. It was impossible to interpret the appearances as a primary sclerosis of one or even two divisions of the cord. There were considerable differences from the usual appearances of the *sclérose en plaques ;* the edges of the sclerosed patches were very indistinct, fading into the normal tissue ; there was no injury in the periphery of the cord.

The microscope furnished important evidence, for it showed that in the sclerosed portions, and in them alone, there was periarteritis and endarteritis, and many minute patches could be seen where a diseased vessel was the central point of spreading sclerosis. The pathological state was in fact a diffuse perivascular myelitis. There was also atheroma of the large arteries and the fibrosed kidney of old age. The muscular atrophy and the cramps (though they held the limbs in flexion and not extension) gave the case a similarity in appearance to some cases of amyotrophic lateral sclerosis; but there were no reflexes and no symptoms of bulbar paralysis before death, which constituted important differences; and there seems no good reason, if scattered vascular disease be taken as the genuine starting-point, why the clinical picture should not be indefinitely varied. (*Revue de Médecine*, Oct. 1884.)

Cholecystotomy.—Drs. J. H. Musser and W. W. Keen publish a carefully-prepared and instructive article on cholecystotomy, in which they relate two new cases, with a table of all the hitherto reported cases, thirty-five in number. The first case was that of a man, æt. 32, who had had attacks of biliary colic for five years, followed by jaundice, until he was reduced in strength, and had chills and fever threatening life. Dr. Keen attempted cholecystotomy, the incision being made over a region of dulness believed to be the gall-bladder. This dulness was found to be due to an inflammatory mass which glued together the gall-bladder, colon, and intestine. No stone could be detected. The wound was closed, and recovery ultimately followed a course of Hathorn water at Saratoga. The second case was also that of a man, æt. 31, with acute gastro-intestinal catarrh, followed by jaundice, enlarged gall-bladder, and symptoms of internal suppuration. The enlargement of the gall-bladder was demonstrated by the hypodermic needle, but the fluid was not bile. Dr. Keen performed cholecystotomy, using a large hollow-handled spatula to drain off the twenty ounces of fluid contained in the gall-bladder. The gall-bladder was found to be seven inches in depth, but neither by finger nor probe could any gall-stone or the orifice of the duct be found. A biliary fistula was established, and bile was discharged through it the next day. The patient died a week later of exhaustion. The post-mortem examination revealed inflammatory closure of the cystic and common ducts at the mouth of the gall-bladder and at the duodenum. Dr. Musser in his medical comments analyses at length the causes, symptoms, and diagnosis of biliary obstruction, under the heads of jaundice, tumour, pain, and suppuration, especially in relation to gall-stones and other foreign bodies and diseases of the ducts. He points out the means by which a just conclusion may be reached, and that cholecystotomy should be resorted to early in the case rather than wait till the blood is disorganised and the liver softened and made functionally useless. Especially is this true in view of the low mortality of the operation, there having been (excluding Gross's incidental case) only nine deaths in thirty-four operations, and of the fact that Mr. Tait has done thirteen operations, by far a larger number than any other operator, all of which have been successful. In his surgical comments, Dr. Keen discusses the surgical means of diagnosis by aspiration, with or without probing through the cannula, and by acupuncture, both of which, when properly done, he commends. He also strongly urges an early laparotomy, followed at once by cholecystotomy, if found advisable, and condemns the attempt to provoke or to wait for adhesions. Indeed, upon this disregard of adhesions hinges the whole of our modern progress in abdominal surgery. He points out that to Bobbs, of Indiana, and to Sims, both American surgeons, is due the credit of first performing and practically perfecting the operation. He advises the formation of a biliary fistula, rather than sewing up the gall-bladder, and disapproves, as a rule, of removal of the gall-bladder as adding a new and, usually, a needless danger. (*American Journal of the Medical Scicnecs*, Oct. 1884.)

Knee-jerk in Diabetes.—The introduction of one new condition into any existing arrangement cannot take place without producing more than one alteration. The phenomenon of the knee-jerk which may practically be said to have been introduced into the sphere of clinical medicine during the past decade bears testimony to the above generalisation. The investigation of the condition of the knee-jerk may seem to some medical men a somewhat novel application of a reflex action. M. Bouchard made a distinct impression by his paper on the subject at the French Association for the Advancement of Science recently held at Blois. The presence or absence of the knee phenomenon in diabetes mellitus is said to possess much importance both from a prognostic and diagnostic point of view. Forty-seven cases observed during the last three years by M. Bouchard were found to have the patellar tendon reflex, and of these cases only two died, or about 4 per cent. Nineteen cases were collected in which the knee-jerk was absent, and of these six were fatal, or about 33 per cent.; the mortality in the latter group may have been still greater, since some of the number were lost sight of. The members of the second category also had a cachectic aspect. M. Bouchard believes that the disappearance of the knee phenomenon in the course of diabetes indicates the entry into a grave and perilous state. It is perhaps lending too much value to the knee-jerk to say that the absence of it has given the cue to the diagnosis of diabetic coma; a statement to this effect may be found in the report from which we abstract our information on M. Bouchard's paper. An infant was found comatose with dry cracked lips and absolutely afebrile; none of its antecedents could be ascertained. The knee-jerk was absent and the coma resembled that met with in cases of intoxication, and of uræmic or diabetic toxæmia. There was the odour of acetone in the breath; some balano-posthitis and intense thirst. A washing from the child's underlinen reduced Fehling's solution. M. Bouchard thinks it necessary to state that the absence of the "tendon reflex" does not favour the nervous theory of diabetes. (*Lancet,* Oct. 4, 1884.)

Eruption following the use of Antipyrin.—Dr. Paul Ernst reports two cases of an eruption caused by the internal administration of antipyrin. The two patients were a boy and a woman, aged respectively ten and sixty-seven years, yet the eruption was so nearly alike in both cases that there could be little doubt that the same cause was at work. The eruption consisted of little irregularly rounded pimples lying close together, and in some places confluent so as to form patches of greater or less extent, between which the skin was normal, thus giving a marbled appearance to the surface. After about five days the eruption began to fade and to assume the character of a brownish pigmentation, and in the old woman there were some faint evidences of desquamation. Traces of the eruption were still visible at the end of two weeks. The eruption was thickest over the body, and on the extremities the extensor surfaces were more covered than the flexor surfaces. In the boy there was some œdema of the face, but in neither case was there any eruption on the head or neck, although the palms of the hands and soles of the feet were not spared. There was some itching in the case of the woman, but the boy did not complain of this. The eruption ran its course and disappeared, although the administration of the antipyrin was not interrupted. The writer explains this by supposing that the system acquired a tolerance for the drug. On this account he advises a continuance of the remedy where its use is indicated, despite the eruption. In a postscript Dr. Ernst states that he has observed three other cases of an exactly similar nature. (*Centralblatt für klinische Medicin,* August 16, 1884.)

Reduction of Dislocation of the Sixth Cervical Vertebra.—In the current number of the *American Journal of the Medical Sciences* Dr. Wiest records a case of dislocation forwards of the sixth cervical vertebra, the reduction of which was attended with apparent benefit. The patient was a man, thirty-three years of age, who was knocked down by the falling limb of a tree which struck him on the left temple. When seen four hours later there was complete motor and sensory paralysis as high as the nipples, only diaphragmatic respiration, and impaired sensation and motion in both arms. The head was extended and rotated to the left side, and there was a deep depression above the seventh cervical spine. Two days after the accident an attempt at reduction was made. The shoulders were fixed, and the head was extended and rotated first to the right and then to the left; a loud snap was heard, and was also felt by the patient, and the cervical spines were found to slide into their proper position. Extension was maintained, but unfortunately the head and shoulders were raised instead of being allowed to lie flat on a firm mattress, with a well-adjusted support for the neck. The patient died on the thirty-fifth day, but the report does not state in any way fully the progress of the case after the reduction, or the mode of death. In addition to the dislocation of the sixth vertebra forwards and to the right, there were three fractures through the right half of the atlas. There was no injury to the cord apparent to the naked eye, but the microscope showed the "connective tissue torn" and the "nerve tubules disarranged." The case is certainly one that encourages surgeons to follow out the same line of practice where there is evidence of the persisting displacement of a vertebra. Although the cord is generally seriously crushed at the moment of the accident, the removal of all pressure upon or irritation of the bruised part is the best way to obviate the ascending myelitis, which is a frequent cause of death. (*Lancet*, Oct. 25, 1884.)

Thyroidectomy in Basedow's Disease.—Four cases are related by Rehn in which this operation was performed. They presented all the usual characters of the disease, palpitation, rapidity of pulse, and difficulty of breathing, &c. In two cases the exophthalmos was very marked, and though they exhibited symptoms of ordinary goitre, the exophthalmos seemed to mark them out as most allied to Basedow's disease. The first case was operated on by opening a large thyroid cyst and draining it; but a fistulous track remained for some time, and the capsule eventually sloughed completely and came away. This result led Rehn in the remaining cases to dissect out the whole diseased mass, which proved perfectly successful, and the exophthalmos gradually disappeared after a few months. In one case there was some paralysis of the recurrent laryngeal nerve, but this was completely cured in four months. (*Centralblatt für Chirurgie*, 36, 1884.)

Dermatosis Diabetica.—Under this title two peculiar conditions of the skin in connexion with diabetes are described by Kaposi. The first of these cases occurred in a woman fifty-one years of age. In the beginning of May 1883, several irritable spots appeared on the left leg below the knee; for about a month these remained stationary; but shortly after this they began to redden, and a little later several distinctly gangrenous spots appeared varying in size from a half-crown, to the palm of one's hand. Upon these gangrenous spots some cloudy bullæ appeared about the size of a pea or small bean. A little later it became evident that whilst the gangrene was making progress on the one side of these sores, healing was taking place under a scab at the opposite side, and very soon the gangrenous portion separated leaving a granulating surface underneath. Kaposi insists that the localisation, growth, and spread of this case mark it as a peculiar form, and one which is quite distinct from gangrena bullosa serpiginosa. A few months later the patient died from exhaustion, the result of diabetes. The second case is quite different from the last, it occurred in a man of sixty years, who had suffered for some time from diabetes. He had suffered from a gradually increasing papillomatosis of the left upper extremity below the elbow. The skin was thickened with warty growths, and some of these had broken down and become sores, whilst others were red and moist, apparently in a sort of intermediate condition. Syphilis and lupus were excluded in this case, and they could not be traced to any other cause than the diabetes. Under a course of Carlsbad salts and local applications both the warts and sores all but disappeared. About three months later the patient died in an attack of diabetic coma. (*Wiener med. Jahrbücher*, 1, 1884.)

Eczema of the Leg treated with Gelatine Medicated Plaster.—Dr. Marrow presented to the New York Dermatological Society a woman, who was scalded nearly two years previously upon the outer surface of the leg; the burn producing a sore which never healed. The surrounding tissues became œdematous and inflamed. Two months previously, when the patient was first seen, she had a general eczema, most marked upon her face, arms, and neck, while the scalded leg was the seat of a severe *eczema rubrum*. The general eczema yielded readily to treatment, but the eruption upon the leg was very rebellious; absorbent powders, iodoform and oleate of bismuth ointment, Lassar's paste, etc., having been used without effect. On the 18th of this month, he first used an application of a medicated gelatine, made after the following formula:

℞	Glycerine	250 parts.
	Gelatine	1,000 „
	Water	2,000 „

medicated with ten per cent. of oxide of zinc, and one per cent. of carbolic acid. This was left undisturbed till the 23rd, when it was removed, and the epidermis was found to be regenerated. It was reapplied on the 23rd, and when taken off the day the patient was exhibited, there was no sign of exudation, and the epidermis was in good condition. The patient says that from the first application the itching had been markedly lessened. In the last dressing there was no carbolic acid in the gelatine varnish. The dressing was seen to form a perfectly smooth, uniform, elastic covering.

Radical Treatment of Hernia.—A series of cases are recorded by Munziger in which this operation has been performed both in cases of strangulation, and also when the hernia is irreducible, or so large as to render an operation advisable on account of its inconvenience.

Of five cases which were operated on when not strangulated all recovered. In four cases the sac was completely removed, and in only one of them was a trace, and that only a slight trace, of recurrence visible after the lapse of two and a-half years. The fifth case was a congenital one, and the opening of the sac into the abdomen was carefully sewn up and readily healed. Two and a quarter years later a small easily reducible hernia was present. The remainder of the operations were performed upon strangulated ruptures. Out of a total of forty-five cases of strangulated rupture, thirty-two were selected for the radical cure. Seven of these died, leaving a total of twenty-five recoveries, nine of which showed some signs of recurrent herina after a few months. Munziger recommends this operation in all cases where it can be safely performed, and where peritonitis or other complications do not render it undesirable. With regard to its performance where there is no strangulation, it should only be employed where the hernia is so large or troublesome as to render a truss quite useless. (*Centralb. f. Chirurgie*, p. 687, Oct. 1884.)

Extracts from British and Foreign Journals.

Total Extirpation of the Uterus.—Tauffer reports five cases of this operation. Of these five all but the first were successful; and the lack of success in this case is attributed by the operator to drainage of the peritoneum, which he recommends should only in very exceptional cases be employed. Tauffer's mode of procedure is first to remove with the cautery the ulcerating portions, and then, if granulation ensues, to remove the rest later. He first separates the uterus and upper part of the vagina from the base of the bladder, opens the peritoneum in Douglas's pouch, and fixes its edge with ligatures of silk. He then seizes the lateral ligaments and Fallopian tubes and pulls them down. After this he employs a pair of bullet-forceps bent on the flat to separate the anterior and posterior folds of the peritoneum from the uterus. When these are cut through and their edges have been secured with silk threads, the uterus becomes more moveable and manageable and the Fallopian tubes and lateral ligaments are tied in as many separate pieces as may be needful, and the uterus finally cut away from its attachments. The rest of the operation consists only in bringing the Fallopian tubes into a corner of the wound and then bringing the peritoneal edges together by small stitches, and deep button stitches as well. The ovaries are only removed in case they prolapse. (*Centralb. f. Chirurgie*, No. 34, p. 567, 1884.)

Stenosis of the Larynx and Trachea following Typhoid Fever.—Two hundred cases of this form of affection have been collected by Lüning, and he discusses at some length their pathology and treatment. It seems to begin as an ulcerative process in the various parts of the larynx, in the cartilage, perichondrium, or soft parts; sometimes it selects one part of the larynx, sometimes another. From the patient's own sensations and complaints it appears to be extremely difficult to arrive at a certain diagnosis. Oftentimes it is not discovered till the post-mortem; in other instances the expectoration of lumps of pus, blood-stained mucus, or pieces of cartilage, proclaim its presence and progress. In a few cases a hurriedly performed tracheotomy saves the patient's life. This operation seems to afford the best results by far, and is the only treatment of any real avail; for whilst out of fifty-two patients only two recovered without operation, seventy-seven out of 147 recovered after its performance. As a general rule the patient is compelled to wear a tube for the rest of his existence, as the stenosis is too great to admit of its removal, but in some cases it has been dispensed with even after one year. (*Centralb. f. Chirurgie*, No. 39, 1884.)

Extirpation of the Rectum for Cancer.—If this operation is to be performed Professor Esmarch recommends that the rectum should be first most carefully examined. The rectum must be thoroughly moveable, and not bound down to the surrounding parts, otherwise it is useless to attempt the operation. The harder and more circumscribed the cancer, and the less pain it has given rise to, the more favourable the prognosis. The situation too of the cancer in the mucous rather than in the submucous tissue is another favourable sign. The operation succeeds well if only one part of the wall is affected, and especially if that one part is the hinder portion. If an incision be carried far back to the coccyx plenty of room will be obtained, and the rectum can be removed as far up as the commencement of the sigmoid flexure. It is better, if possible, to bring down the upper end and attach it to the lower, whilst the external sphincter is preserved. If this be done good, power of retaining the fæces will be the result. The excision of a narrow ring some distance up never succeeds, as the lower end of the intestine sloughs. Good provision should of course be made for drainages, and if the peritoneal cavity is opened it should be closed at once. In rare cases where the peritoneum is rendered septic by the fæces which have found their way into it during the operation it is advisable to drain it. (*Centralb. f. Chirurgie*, p. 689, Oct. 1884.)

The Treatment of Sycosis.—Dr. H. v. Hebra recommends the modified Wilkinson's ointment as an excellent application in sycosis. (The formula is—

℞ Sulphur. Sublimat.
Ol. Cadini āā ʒiv.
Saponis mollis.
Adipis āā ℥j.
Cretæ præparatæ ʒiiss.
M. Ft. ungt.)

The hair on and around the affected part is cut short, and the scabs and crusts removed by the application of any simple ointment. After twenty-four hours the affected part is soaped, shaved, and thoroughly brushed with the Wilkinson's ointment. It is then covered with flannel and a bandage applied. The dressing is changed daily, and the ointment washed off and all the hairs which are surrounded by pustules are epilated and the pus squeezed out. This is continued so long as pustules form, but even in obstinate cases this ceases in about ten to fourteen days. In slighter cases there are no pustules after the first few days. The part is then shaved only when necessary for the proper application of the ointment. The tender scaling skin soon acquires, by the application of oxide of zinc ointment prepared with vaseline, its usual smoothness and appearance. (*Wien. mediz. Blatter*, 1884, No. 17, and *Monatshefte für praktische Dermatologie*, vol. iii. No. 6.)

Poisoning by Tinned Food.—Dr. J. G. Johnson, in a paper read before the Medico-Legal Society of New York, comments on six cases of corrosive poisoning from eating "canned" tomatoes. The symptoms were intense gastric and intestinal disturbance, followed in the worst cases by epileptiform convulsions and coma. Dr. Johnson's investigations led him to conclude that the noxious substance was a combination of muriate of zinc and muriate of tin. From his remarks it appears that in some establishments the tops of preserving tins are soldered on, not with a resin amalgam, but with a saturated solution of zinc in muriatic acid. When this mixture is too freely applied it overflows into the tin and poisons its contents. The danger from this process has been so far recognised that in the State of Maryland there is a law prohibiting the use of "muriate of zinc flux." Dr. Johnson appends to his paper a few useful rules for the detection of unwholesome tinned meats by the appearance or handling of the tins. "If the lid of a tin has two solder holes instead of one (showing that the tin has been exhausted a second time to liberate decomposition gases), the contents are likely to be unwholesome. Press up the bottom of the can. If decomposition is commencing the tin will rattle the same as the bottom of the oiler of your sewing-machine does. If the goods are sound it will be solid and there will be no rattle to the tin." Rust round the inside of the head of the tin produced by the eating away of the tin-plating by a corrosive substance should also be looked on as suspicious. (*Medico-Legal Journal of New York*, April 1884.)

The New Cardiac Medicines, Convallaria and Caffeine.—In a lecture on this subject, delivered at the Hôpital Cochin, M. Dujardin-Beaumetz explained that by the term "new" he meant the medicines which have come into common use within the last five years in the treatment of cardiac diseases: convallaria, caffeine, and nitro-glycerine; the first two being applicable to the treatment of mitral diseases and acting as cardiac tonics, the third being more particularly directed to the treatment of diseases of the aortic orifice and the aorta. This distinction, in a therapeutic sense, between mitral and aortic diseases, which was established in his *Leçons de Clinique Thérapeutique*, seems now to be quite generally admitted; and as regards their cure, a marked difference should be established between them. In mitral diseases the object is to increase the force of the heart, and for this purpose the cardiac tonics are given. In order to better indicate the time when the cardiac tonics act most efficiently, the time over which the cardiac affection runs is divided into several periods, extending from the simple lesion to the period of cachexia. In the first period, to which Fernet and Huchard have given the name "eusystolic," the simple valvular lesion exists without alteration of the muscular structure; in this period hygienic care is alone applicable. In the second period, the "hypersystolic," cardiac hypertrophy compensates the troubles arising from the valvular lesions; and here, also, hygienic care is sufficient. In the third, the "hyposystolic" period, the compensation is ruptured and cardiac tonics are necessary. In the fourth, the "asystolic" period, the heart is in a state of fatty degeneration, or of cardioplegia, as Gubler said, and the most energetic of the cardiac tonics, with the exception perhaps of caffeine, are powerless. In aortic diseases our medication must be directed differently, and against the cerebral anæmia and the irritation of the nerve plexuses surrounding the aorta, which result from the aortic lesions; it is here that drugs which stimulate the cerebral circulation and diminish the nervous sensibility are applicable. It should be well understood that this distinction in treatment is applicable only to one phase of cardiac diseases, and that in aortic diseases, insufficiency for example, there comes a time when on account of dilatation of the heart the mitral valve becomes insufficient, and both diseases must be treated at the same time.

Most important among the cardiac tonics must be placed digitalis, then bromide of potassium, and to these are now added convallaria and caffeine. As regards its action on the human system, convallaria is known as one of the most powerful diuretics, Germain Sée placing it even before digitalis. It is, therefore, especially applicable to mitral diseases accompanied by dropsy; but it should be stated that the diuretic action is decreased when there is albuminuria. It has, moreover, a calming effect upon the palpitations and disorders of the heart which do not properly belong to a valvular lesion, and if it be added that its preparations do not cause toxic phenomena in man, its principal advantages have been stated. Although it must be admitted that its action is at times very uncertain, it is a valuable cardiac tonic, for it may be used when we cannot use digitalis, and it has no inconveniences. It is well known that digitalis cannot be used continuously, and it is during the intervals that convallaria may be employed, taking care at the same time not to attribute all the diuretic effects which may result to the action of the latter, as the action of digitalis is kept up for some time after it is discontinued. The most useful preparation is the extract of the leaves and flowers, which may be prescribed in the following formula:—

Extract of leaves and flowers of convallaria, ℈ vss.
Syrup of orange flowers.
Syrup of five roots, āā f℥iv.

The syrup of Langlebert, who has specially studied the preparations of convallaria, may also be prescribed; it contains grs. vij to the teaspoonful. Grs. xx or xxx of the extract may be given during the day, or three or four teaspoonfuls of one or the other of these preparations. The tincture of the flowers may also be given in doses of fʒss-j per diem, but this preparation is not very certain.

Caffeine is one of the best cardiac tonics, and in the last stages of a cardiac disease it is of more service than digitalis. Properly speaking, according to Tanret, there is neither an acetate, a valerianate, a lactate, nor a citrate of caffeine. The bromhydrate and the hydrochlorate are unstable. Tanret has, therefore, proposed a perfectly stable compound of caffeine and salicylate or benzoate of soda; the first containing 45·8 per cent., the latter 61 per cent. of caffeine. They are perfectly soluble, have no local irritant action, and may be used hypodermically, or per os:—

Benzoate of soda, gr. xliv¾, or 2·95 parts by weight;
Caffeine, gr. xxxviiss, or 2·50 parts by weight;
Distilled water, fʒijss, or 6·00 parts by weight.
Each sixteen minims contain gr. iij¾ of caffeine.

Salicylate of soda, ℈ij gr. iss, or 3·10 parts by weight;
Caffeine, ʒj or 4·00 parts, by weight;
Distilled water, fʒijss, or 6·00 parts by weight.
Make a cold solution: ♏xvj contain gr. vj of caffeine.

Caffeine should be given hypodermically only in exceptional cases, as when the patient cannot retain it when taken per os, or when it causes pain in the stomach. It is usually administered in the form of pills, granules, cachets, or in solution. A great advantage of caffeine is that its diuretic effects are seen even when the kidneys are altered, and it is in the last stage of heart disease that its effects seem to be best. (*Bull. Gén. de Thérap.*, August 15, 1884; *Amer. Journ. Med. Sciences.*)

Intestinal Nerve-changes in Pernicious Anæmia and General Atrophy.—Sasaki (*Virchow's Archiv*, vol. 96, 1884) believes that the gastro-intestinal form of pernicious anæmia depends upon anatomical lesions of the nervous structure of the intestinal tract. In one case of this kind he found sclerosis of the ganglion cells, with subsequent destruction of them, decrease in size of the nerve-fibres, and very many bright homogeneous bodies of hyaline character, in Auerbach's and Meissner's plexuses. In another case fatty degeneration had taken place, extending to the muscles. In localised affections of the intestines, as typhoid fever, catarrh, etc., a similar degeneration was found in many cases. but it was limited to the vicinity of the diseased portion of the intestine. Sasaki believes, therefore, that neurotic atrophy of the whole intestinal tract lies at the bottom of these conditions, and causes the general disturbances of nutrition. (*Centralbl. für klin. Med.*, August 9, 1884.)

Calculus Impacted in the Ureter.—Mr. Henry Morris, surgeon to the Middlesex Hospital, London, in a very interesting paper, discusses the feasibility of removing from the ureter an impacted calculus, which, if allowed to remain, will sooner or later surely cause destruction of the kidney if not of life. He discusses very fully the clinical history, diagnosis, and prognosis of these cases, and finally urges that a calculus impacted in the ureter sufficiently near the vesical orifice to be felt with the finger can with care and suitable instruments be extracted through an incision of the bladder wall without fear of wounding the peritoneum, or laying open the cavity of the bladder into the cellular tissue of the pelvis. He describes his method of operating as follows: Having rapidly dilated the urethra if the patient be a female, or opened the urethra in the median line immediately in front of the prostate if the patient be a male, the neck of the bladder should be passed by the index finger of the left hand, and a careful digital examination made of the bladder walls. If a hard fixed body be felt covered over by the bladder mucous membrane, at or near the orifice of one of the ureters, a gum-lancet-shaped knife on a long slender shank should be introduced along the left index finger, and with it an incision should be made through the tissue covering the calculus. The knife should then be carefully withdrawn, and a slender scoop or curette introduced along the index finger of the left hand still retained within the bladder should be employed for gently turning the calculus out of its bed. Mr. Morris urges that an exploration of the bladder should be made with the view of performing this operation on the ureter:—(1) In hydronephrotic or pyonephrotic enlargement of the kidney, associated with bladder symptoms, with the hope of re-establishing the natural drainage through the ureter. (2) Before the nephrectomy is resorted to for hydronephrotic or pyonephrotic tumours, which have been opened or tapped through the loin without benefit. (3) Before nephrectomy is resorted to in cases of suspected renal calculus, in which no renal tumour exists, and where, after digital exploration and puncture of the kidney through the loin no stone is found. (4) In cases of sudden or rapid suppression of urine, or anuria, occurring after symptoms which have given rise to suspicion of stone in one or other kidney or both kidneys. A kidney which has undergone compensatory hypertrophy may become blocked by a calculus which has been forced by the superimposed urine in the lower end of the ureter, and which cannot pass the vesical orifice of the ureter. Such a kidney may be, probably is, the only one the patient has to depend on; and in this case death must ensue if the obstruction is not removed. If no stone can be felt through the bladder, life may yet be saved by giving a vent to the pent-up urine by lumbar nephrotomy. (*American Journal of the Medical Sciences*, October 1884.)

Distilled Water in Calculous Disorders.—It is now some years since Dr. Murray drew attention to the fact that the continued use of soft water brought about in many instances the disintegration of small renal calculi. Since then soft or rain water has been extensively employed, not only for the solution of calculi, but also for the relief of dyspepsia associated with persistent deposits of urates and oxalate of lime crystals. In the country, with opportunities for the storage of rain water, there is no difficulty in procuring a sufficient supply of soft water for the purpose, but in large towns considerable difficulty has been experienced in obtaining soft water in quantity and also sufficiently fresh to be palatable—the distilled water sent out by chemists in gallon jars, which is generally resorted to, being apt to become stale and acquire an unpleasant flavour by keeping. This difficulty has been met by supplying distilled water in an effervescing form by charging it, we believe, with carbonic acid gas. This renders the water brisk and palatable, without, as a rule, impairing its solvent action. Still there are some cases, notably those attended with persistent deposits of oxalate of lime in the urine, in which the ingestion of large quantities of water charged with carbonic acid is not advisable, and it would be a distinct advantage if, in addition to distilled water rendered sparkling with carbonic acid, we could procure a water simply charged with compressed air; whilst a water so charged, but with an additional volume of oxygen introduced, would often be a distinct advantage. Independently of its use as a solvent, it must be remembered that distilled water is one of the best and simplest diuretics, and that in a pleasant and palatable form it could be employed with benefit in many of those cases of dyspepsia in which the urine is highly concentrated, and which Murchison considered to be the result of lithæmia. (*Lancet*, October 25, 1884.)

Gonorrhœal Rheumatism.—M. Terrillon, lecturing at La Charité, observed that by a curious chance he had two patients in his wards suffering in a very similar manner from this somewhat rare affection. They were both young men who had been for a few weeks the subjects of subacute gonorrhœa, when they were seized with severe inguinal pain with fever and *embarras gastrique*, one of the patients feeling considerable pain and tenderness on pressure in the vicinity of the hip-joint, while in both the movements of the joint were somewhat impeded, and in both there was a deep-seated doughy resistance in the inguinal region. The conclusion arrived at was that the bursa situated beneath the psoas was the seat of pain, but this continued for some time rather obscure. This rheumatic affection is not merely a coincidence of the gonorrhœa, but a form of rheumatism which develops itself without any other cause whatever than the gonorrhœa. It is indeed not rare to meet with patients who, having been cured of a first attack of rheumatism occurring under these circumstances, do not suffer from subsequent attacks unless they contract a second blennorrhagia. This form of rheumatism has its peculiarities, for it attacks females very seldom, and nearly confines its attacks to the large joints—the hip, knee, and elbow, the smaller joints only suffering secondarily. Moreover, it is generally uniarticular. Sometimes it is attended with effusion into the joints, while at others it gives rise to ankylosis in even ten or fifteen days, the rapid formation of fibrous adhesions rendering this incurable. This rheumatism may, however, affect other parts than the joints. Thus (1), what seems to be an articular affection may really be one affecting the neighbouring tendinous sheaths, a tendinous synovitis with swelling and effusion. (2) It may invade the muscular system, the muscles of the neck, the deltoid, or even the motor muscles of the eye being affected. (3) It may manifest itself in the serous bursæ, near the joints, as the hip, patella, or elbow. (4) It may attack the sciatic nerve, and this is not very rare. (5) M. Guyon first pointed out a doughy state of the cellular tissue that may occur, accompanied by pain and heat. (6) Many examples exist of its attacking various tissues at once in the same region. Gonorrhœal rheumatism, moreover, is peculiar in not giving rise to any visceral phenomena, so that affections of the chest do not result from it. It is also fugaceous and does not reappear, except after a new gonorrhœa. The relation between it and the discharge is somewhat curious, for in some patients who had had abundant discharge, this diminishes as soon as the rheumatism is manifested; but this is not constantly the case. As to its prognosis, the disease may be said to be of but slight importance when it attacks only the tendinous sheaths, the bursæ, and the muscles; but this is far from being the case when a joint is invaded, for so easy is it for ankylosis to take place that our first object should be to place the limb in the most favourable position in case this should occur. Even when ankylosis does not occur, stiffness of the joint is one of the most common sequences, and this, accompanied as it often is by muscular atrophy, is long in disappearing. In these cases we must allow the joint to gradually resume its movements and not endeavour to force this by violent measures, under pain of finding the fibrous bands increase in number and thickness. This state of atrophy and stiffness is much benefited by electrical currents, by *massage*, by sulphurous douches, and by a course of mineral waters at Aix. The treatment of gonorrhœal rheumatism is not the same as that of ordinary rheumatism in which salicylic acid is the heroic remedy. Here it is of no avail, and we have to content ourselves with revulsives, chiefly blisters, repeated as many as three times at intervals of two or three days. When the effusion is abundant we should not hesitate to puncture the joint, which is an excellent proceeding, relieving it at once of a mass of liquid which would require at least two or three weeks for its absorption. After the puncture, effectual compression should be applied. Finally, the disease leading to a considerable depression of strength in the course of a few days, its subjects should be carefully "tonified" and the tonic *par excellence* in such a case is the sulphate of quinine. (*Gazette des Hôpitaux*, August 7; *Med. Times.*)

Treatment of Ozœna.—The following is the formula employed by M. Vidal at the Hôpital St. Louis, in the treatment of ozœna. Solution of chloride of zinc (5 per cent.), 1 ounce; boracic acid, 14 grains; water, 28 ounces; ammonia, q. s. to neutralise the fluid. A little of this solution in snuffed up into the nostrils several times a day. M. Gorecki employs for the same purpose, and in the same way, a warm saturated solution of boracic acid. By means of one or other of these preparations the fœtid odour may be destroyed, in most cases, within a few days. (*Journal de Médecine et de Chirurgie pratiques*, August 1884.)

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⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BAILLIÈRE, of King William Street, Charing Cross.

Department of Public Health.

OVER-PRESSURE IN BOARD SCHOOLS.

THE Sub-Committee appointed by Managers of London Board Schools to consider the question of "over-pressure" have obtained much information on the subject, and have carefully considered the question submitted to them.

1. They are convinced that the children are, as a whole, not only educationally but physically, much the better for attending school.

2. At the same time, there is evidence that under certain conditions (on the one hand, where the child is underfed, suffers from bad health, defective intellect, long-standing neglect or irregularity; and on the other hand, where the child is over-excitable, too eager or anxious), some over-strain does occasionally occur. But the cases of over-pressure are proportionally not numerous, nor is the evil widespread.

3. They believe that much has been done, and more will in the future be done, by the new code to prevent over-pressure.

4. But they think that the new code cannot produce the results intended, unless it is administered in spirit as well as in letter; and they do not think that this is always the case at present.

5. With this preface, the sub-committee beg leave to make the following recommendations:—

(i.) *Home Lessons*:—As a general rule they do not think home lessons desirable; and they recommend that their imposition should be left to the discretion of the managers and teachers *jointly*. The sub-committee are of opinion, moreover, that home lessons should be absolutely prohibited for children below the third standard, and altogether in schools of "special difficulty."

(ii.) *Keeping in for Lessons in cases of backward children*:—They endorse the recent Circular of the Board on this subject, which absolutely prohibits "keeping in" except for punishment.

(iii.) *Board Inspection:*—They strongly recommend that the Board's Inspectors should be more of "inspectors" and less of "examiners."

They also recommend that, except under special circumstances, the reassessment of H.M.'s Inspectors' Reports by the School Management Committee should be discontinued.

(iv.) *Returns, &c.:*—They recommend that all returns, accounts, correspondence, &c., falling on the teachers, should be, as far as possible, minimised.

(v.) *Power of withholding children from examination and from preparation for examination:*—By the code, the managers have power to withhold children from examination, if they can satisfy H.M.'s Inspector of the reasonableness of the ground for withdrawing them. Such withdrawals do not in any way affect the grant. Managers can also, for reasonable cause, present a child a second time in the same standard.

The sub-committee find that these provisions of the code are not generally understood. They recommend, therefore, that managers should be specifically instructed that they have the power, and ought to undertake the duty, of withdrawing from examination such children as are likely to suffer from the examination itself, or from the preparation for it; and that it should be pointed out to them that they cannot perfrm this duty unless these children are watched throughout the year. The withdrawal should be consequent on the managers' own observations and the recommendation of the teachers.

(vi.) *Managers:*—The appointment of competent managers in sufficient numbers is a matter of the greatest importance, and the sub-committee recommend it as demanding the serious attention of the Board. It is impossible without the frequent visits of competent managers, co-operating with the teachers, that the discrimination required by the code, between those children who are fit and those unfit to be prepared for examination, should be properly made; and it is obvious that in many other matters in the course of their school life, some of them bearing on over-pressure, children may be materially helped and befriended by the managers.

(vii.) *Underfeeding and Irregularity:*—Though both these matters largely conduce to such over-pressure as exists, the sub-committee make no recommendation in regard to them. The first subject is now being considered by a council appointed for the purpose; the second is one largely depending on the administration of the compulsory powers of the Board, and on the personal influence of the teachers.

THE RESULTS OF THE NOTIFICATION OF INFECTIOUS DISEASES.

(*Continued from* p. 69.)

Chester (Cheshire).—Population 36,794 in 1881. Compulsory powers not adopted until 1884. Notification required both from the occupier and from any medical practitioner in attendance. The diseases to be notified are:—small-pox, cholera, typhus, scarlet continued and puerperal fevers, scarlatina and diphtheria, and such other disease as the Corporation under the provisions and for the purposes of the Act (Chester Improvement Act, 1884) may from time to time declare to be infectious.

Croydon (Surrey).—Population 78,953 in 1881. Compulsory powers only adopted in 1884. Notification required both from the occupier and from any medical practitioner in attendance. The diseases to be notified are the same as in the case of Chester.

Derby (Derbyshire).—Population 81,168 in 1881. Compulsory powers adopted in 1879. Notification required both from the medical practitioner and occupier. Diseases to be notified—small-pox, scarlatina, diphtheria, typhus, typhoid or enteric fever, relapsing fever, puerperal fever, and cholera.

When the Annual Report for 1880 was issued, it dealt with a period of twelve months, during which the compulsory clauses as to notification had been in operation, and Mr. Iliffe, the Medical Officer of Health, states that the Act embodying them had even then materially contributed towards diminishing the number of illnesses, as well as the number of deaths from fever &c. Continuing, he says:—

"It has certainly been of practical value in bringing to light many insanitary conditions existing in houses and areas, which might otherwise have been overlooked until further disease or death had taken place; and it has enabled" him "to limit the spread of infection in many localities by adopting means of isolation, disinfection, &c., and also by keeping children likely to spread disease from attending school and other public resorts, a danger that was formerly too common." It had also enabled him to trace "the course of disease, and the origin of various attacks . . . . and many sanitary defects in drainage, water supply, and the disposal of refuse had been brought under notice and remedied."

He further points out that the Act will place him in a position to determine whether a town like Derby is ever free from cases of some kinds of infectious disease, and that reliance on the death-table alone is liable to deceive one, and to give a false sense of security.

> "The objections to the Act have been few and far between in Derby. What at first was feared would be an infringement of the liberty of the subject . . . . has by judicious management, turned out in practice to be entirely the reverse. Instead of repulse on visiting houses where infectious disease was known to exist, as a rule, thankfulness and gratitude have followed the steps of the Medical Officer and his Inspectors. . . . . On the part of the general public it may be stated that opposition has been *nil.* On the part of medical men, with but one peculiar exception" which will be referred to in subsequent reports, "it may be said that the greatest assistance has been given. . . . . It is not to be expected that in every instance a medical man in busy practice can always be accurate and expeditious in his certificates, and full allowance has been made for such defaults. It has been only when the case has appeared to arise from contumacy that steps have been taken to vindicate the authority of the Committee. Fortunately, in only one instance has it been found necessary to apply legal pressure, when it appeared that there was no desire to evade the law, but an ignorance only as to the application of the Act. In another instance (the one to be referred to hereafter), 'strong letters of remonstrance had to be written.'"

Mr. Iliffe then quotes a letter which he had addressed to certain societies in reply to questions as to the working of the Act. The letter contains the following statements:—

> "The system has not had quite a year's trial. Its operation hitherto has been very successful. The medical men are, with perhaps one or two exceptions, great helps in the matter. . . . . The inhabitants of the town have not in any way evinced any opposition to the system—in fact we have received every encouragement from them. . . . . In Derby, we have reason to be satisfied with our infectious clauses; they have operated well and smoothly, and manifestly to the advantage of the public health."

During 1880, the death-rate from all causes had been 20·0 and the rate from the seven principal zymotic diseases 2·8 per thousand living, the deaths including measles 49, scarlet fever 43, diphtheria 1, and fever 24. The cases brought under notice under the Act were 1,295 in number; they included 372 of scarlet fever, 148 of "fever," 6 of puerperal fever, 728 of measles, 25 of rubeola, 14 of diphtheria, and 1 of erysipelas. The visits paid to these cases were 4,744 in number, 638 rooms were fumigated, and a number of cases of scarlet fever were removed to the Sanatorium.

The Annual Report for 1881 gives the general death-rate as 19·1, and the zymotic rate as 2·0 per thousand living; the zymotic diseases ending fatally including 2 cases of small-pox, 3 of measles, 31 of scarlatina, 2 of diphtheria, and 23 of "fever." The certificates received were 331 in number, and the cases which thus came under notice were, 423 of scarlatina, 96 of "fever," 46 of small-pox, 6 of diphtheria, and 6 of puerperal fever; in all 577. To these cases 2,184 visits were paid; 466 rooms being fumigated, and a large quantity of bedding, clothing, &c., being removed to the disinfecting oven at the Sanatorium.

As the result of a second year's experience Mr. Iliffe says that the powers

> "are of immense importance and value to the inhabitants of the borough. They may be considered the foundation of the principal sanitary work carried out; at all events they usually furnish the ground for the initial action in most necessary and sometimes most radical changes. Without the notification of infectious diseases it would often be impossible to convince owners and occupiers of property that illness and perhaps death were lurking in their dwellings, in the shape of evils unseen by those untutored in sanitary science."

With regard to medical practitioners it is stated:—

> "No difficulty or opposition whatever has been experienced from them, with one exception. This one exception has been troublesome throughout; not that he has any objection to notifying infectious cases to the sanitary authority, but he quarrels upon the point of time when this should be done. He contends that the sanitary officials should step in and exercise their jurisdiction when he has stepped out, and with this view he certifies at the termination of an illness, and not at the commencement. This, of course, is in contravention of the Act, which says that the information must be given *forthwith*, on the medical practitioner becoming aware of the existence of infectious disease in his practice. It is also a contravention of common sense, for if information of these cases is to be of any service in preventing the spread of diseases, it is only able to do so when that information is obtained early, viz., on the occasion of the outbreak." At another point of the report it is said:—"One medical man (the one previously spoken of in connexion with this matter) was fined by the magistrates for preferring to act upon his own principles rather than according to the law. The patient's friends were, in the first instance, the informers, backed up later on by the death certificate. One householder was also fined because of not notifying a case of scarlet fever, no medical man being called in. Inadvertence was pleaded, but a fine was imposed. With these two exceptions, everything connected with the

operation of the Act has been an unqualified success. It would be difficult to find any law requiring a certain amount of restraint and of individual self-denial, which has been fulfilled as well as this."

According to the Report for 1882, the general death-rate was 18·7 per thousand, and that for the seven principal zymotic diseases 2·2 per thousand. In all there were 187 deaths from these zymotic diseases, including small-pox 2, measles 30, scarlet fever 63, diphtheria 3, and "fever" 32.

Mr. Iliffe says he

"has again the gratification of being able to record, with one exception, and that a medical one, the complete and smooth working of the compulsory notification of infectious diseases. Each successive year brings with it a greater confidence in its power for good, and also a deeper and fuller conviction of its appreciation by the general public. The exception referred to is that of a medical man who says he has as great a desire as any one to prevent the spread of infectious diseases, and yields to no one in his efforts in that direction. He objects, however, to being compelled to notify cases of infectious disease to the sanitary authority, because he considers that by so doing he is 'acting first the part of a detective, and afterwards that of an informer' on his patients. To some extent this kind of argument may be sympathised with ; but then the Act only contemplates that in the matter of infectious diseases which are not family secrets but public perils, a medical man shall abrogate for once his duty of father confessor. . . . . Unfortunately, it was your duty to institute proceedings against this medical man. . . . With this exception the operation of these infectious clauses was carried out comfortably and without opposition." Again, Mr. Iliife writes that after an experience of three years' working of the Act in Derby he "has not the slightest hesitation in declaring that, without the dual notification, *i.e.* by the medical attendant and the householder, compulsory notification would be an utter failure." In the case of the upper and middle classes notification by the householder might perhaps be sufficient ; but in the lower and lowest orders, it would most certainly come to grief. The latter are not even entrusted with their vaccination certificates, the duty of forwarding which to their proper quarter is thrown upon the Public Vaccinator. It may be doubted whether, in the case of death certificates, if the dead body had not to be removed and buried, such people would take the trouble to send them to the Registrar. How then could it be expected that they would bother themselves about notifying infectious diseases n their own houses ?"

Referring to America in regard to this matter, Mr. Iliffe makes the following remarks :—

"In America the people seem to be much in advance of those here with regard to the prevention of the spread of infectious diseases. The New York *Sanitary Engineer* says, 'The Board of Health of Cleveland require the owner, agent, or tenant of a house, and the physician attending any case of small-pox or of any other disease dangerous to the public, to notify the Board within twenty-four hours. The physician has again to certify when any child from an infected house may be allowed to attend school, and the certificate has to be presented to the school teacher before the child is re-admitted.' In other parts of America the laws with regard to this question are much more stringent than they are in this country; for instance, at Wilmington, Del., there is an 'ordinance to prevent the spread of small-pox, which provides that every physician in charge of a case shall furnish the patient, on returning to health, with a certificate of recovery from that disease. Any such person who goes out upon the streets without having obtained a certificate is made liable to a fine of $25. It is made unlawful for any member of a family where small-pox exists to leave the house after the posting of a flag, or if leaving to return during the existence of the contagion. The Board of Health are to designate persons to take orders from the family for food and medicine, and any member of it who shall be found in a public street before the dwelling is disinfected is liable to a penalty of $25. Every person who shall have recovered from small-pox, or in whose house a case has occurred, is required to report to the Board of Health that an officer may be sent forthwith to inspect the house and report on its disinfection.' If then the free-born and free-thinking people of America submit to imposts on their liberty to this extent for the benefit of the whole inhabitants, surely a medical man in England may not suppose that he is hardly dealt with, when he is required simply to notify infectious diseases to the Health Authorities for the purpose of enabling them to prevent their extension."

The number of medical certificates and the cases they brought under notice, which were recorded under the Act, were as under:—

	Small Pox.	Scarlet fever.	Enteric fever.	Diphtheria.	Puerperal fever.	"Fever" undefined	Totals.
Certificates	13	594	90	10	6	—	713
Cases ……	15	770	111	10	6	2	914

To these cases 3,926 visits were paid, the average being four to each; 733 rooms were fumigated, and all clothing and bedding was removed to the disinfecting oven when this was considered necessary. Amongst other work, 750 houses had their sink drains disconnected and made to discharge on to a trapped gully outside the house. Speaking of such work, it is stated that the amount of it

"will give some idea of the extent of the operations under the Compulsory Notification Act, and when it is considered that all this has been effected without any hitch, except from the medical man above referred to, it says much for the satisfactory carrying out of these provisions against the spread of infectious diseases."

Incidentally Mr. Iliffe refers to the fact that the infectious disease ambulance is a "wretched . . . . heavy, worn-out old four-wheeled cab . . . . inconvenient, unsightly, and a torture to patients who are very ill."

The Report for 1883 records the general and zymotic death-rates as 18·2 and 1·6 per thousand respectively; the deaths including—small-pox 1, measles 30, scarlet fever 20, diphtheria 1, and "fever" 19. The cases of scarlet fever heard of were 506 in number, and of these 117 were sent to the Derbyshire Infirmary where a separate pavilion is maintained for the treatment of infectious diseases. The accommodation should, however, be limited to one disease, and it is by no means sufficient for the purposes of the borough; indeed Mr. Iliffe says that all who would have been willing to submit to isolation in hospital could not be received there. He refers to the temporary hospital at Rowditch as having been maintained in good order, but it was apparently not utilised. The mortuary was found to be of much service. The provision of a proper ambulance was still needed.

> "During 1883 the Compulsory Notification Act was carried out without any trouble whatever. No prosecution took place for non-compliance with its provisions; on the contrary, the only medical opponent of notification sent in certificates, which leads to the assumption that in that quarter better counsels have prevailed, and the apprehended danger of interference with doctors and their patients has not been fulfilled."

The number of medical certificates received, and the cases to which they related, were as under:—

	Small-pox.	Scarlet fever.	Enteric fever.	Diphtheria.	Puerperal fever.	Totals
Certificates	1	397	45	7	7	457
Cases	2	506	51	8	7	574

With regard to the influence of compulsory notification of infectious diseases in Derby, it should be stated that the only provision for isolation made by the urban sanitary authority consists of a wooden pavilion erected during a small-pox panic in 1872. When this building was reported on in the Official Report on Infectious Hospitals, it was described as a structure only fitted to deter the public from entering it, and it was one of the group of temporary structures which were held up by way of cautioning authorities against the erection, during periods of emergency, of buildings which were certain in the long run to do more harm than good to the cause of isolation. Small-pox patients can as a rule be induced to enter almost any sort of building, and the tarred wooden hut at Derby has doubtless served to stay the spread of small-pox as the cases have been notified. For scarlet fever and the other infectious fevers no proper provision has been made by the authorities. But owing to the circumstance that a separate pavilion for infectious diseases is maintained at the Derby Infirmary, into which patients may be admitted both from the town and country, the urban district has not altogether been in want of the means for utilising the information which they obtain under their special Act, and a goodly number of cases of scarlet fever, for example, have at intervals been received into the pavilion in question, from the urban district. If the value which the Corporation have attached to the desirability of securing early isolation is to be measured by the character of the provision made for the removal of patients from their homes, Mr. Iliffe's description of the "ambulance" which has heretofore been used conveys an impression by no means favourable to an authority which has gone to Parliament for special powers to prevent the spread of infection.

The subjoined table supplies certain statistics which are of interest in connexion with the subject of compulsory notification.

Date.	Estimated Population.	General death-rate per 1000 living.	Zymotic death-rate per 1000 living.	Deaths from scarlet fever.	Scarlet fever death-rate per 1000 living.	PROPORTION OF DEATHS FROM SPECIFIED CAUSES TO 1000 DEATHS FROM ALL CAUSES.			
						Scarlet fever.	Diphtheria.	Continued fevers.	Small-pox.
1877	53,841*	21·0	2·4	9	0·17	7·9	0·8	20·3	—
1878	80,385	20·3	3·1	64	0·78	39·0	1·2	19·5	—
1879	80,385	24·7	4·7	244	3·03	122·7	4·0	12·0	—
1880	80,385†	20·0	2·8	43	0·53	26·6	0·6	21·0	—
1881	81,648	19·1	2·0	31	0·38	19·8	1·2	14·7	1·2
1882	83,587	18·7	2·2	63	0·75	40·2	1·9	20·4	1·2
1883	85,574	18·2	1·6	30	0·35	12·8	0·6	12·2	0·6

* Before extension of borough.

† Compulsory notification for the first time in operation.

Dewsbury (Yorkshire).—Population 29,637 in 1881. The provisions as to the compulsory notification of infectious diseases are embodied in the Dewsbury Improvement Act, 1884. Both the occupier and medical practitioner are required to notify to the authority, and in all essential respects the provisions as to notifying are the same as those recommended by the Special Committee of the House of Commons, and which were given in detail in the first portion of this article.[1] The Dewsbury Improvement Act, 1884, contains certain other special provisions as to infectious diseases. Thus the Corporation is required to provide temporary accommodation during the disinfection of dwellings; they may provide nurses and charge for them; cow-keepers can be required to furnish lists of their customers in certain instances; and there are special provisions as to disinfection, the retention and disposal of the infectious dead, &c. Under an Interpretation Clause the term "Infectious Disease" is defined as including small-pox, cholera, scarlet relapsing, continued, and puerperal fevers, scarlatina, and diphtheria, and such other disease as the Corporation under the provisions and for the purposes of the Act may from time to time declare to be infectious.

FURTHER NOTE ON THE CHOLERA EPIDEMIC, 1884.— THE OUTBREAK AT YPORT.

THE statistics which we recorded in our issue for November, 1884 (vol. xxxiii. No. 5.) described the extent of the epidemic in Southern Europe up to about the third week of October. The deaths which occurred after that date in the south of France, in Italy, and in Spain were not numerous; in several localities they only recurred at somewhat distant intervals, and the figures which we formerly gave may, in the absence of accurate official returns, be taken as fairly indicating the mortality which the epidemic occasioned in those portions of Europe. Extension of the infection to Algeria was, however, at a later date shown to have taken place on a somewhat wide scale, and the latest account received referred to the diffusion of the disease into the interior of Africa.

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[1] See p. 470, vol. xxxiii.

November had hardly set in when information was issued as to the existence of cholera in Northern France. The town of Nantes was apparently the first place which received the infection. By the 1st of November some twenty-four deaths had already taken place there, and by the middle of the month when, so far as could be learned, the outbreak was at an end, there had in all been between fifty and sixty fatal attacks. After sundry rumours and denials as to the spread of the disease to Paris, it was officially admitted by the end of the first week of November that cholera was prevalent in the French capital. Three cholera deaths were recorded there on November 4th, by the 9th of the month the mortality had reached to over fifty a day. The highest fatality took place between the 11th and the 14th, when the daily number of deaths ranged from seventy-five to ninety-eight, and by the 22nd the number had fallen to twenty a day. Soon after this date it was publicly announced that the epidemic had subsided, and although between seventy and eighty deaths are known to have taken place within a comparatively short time of this announcement, no further official records as to cholera deaths were issued. In all, nearly 900 fatal attacks are known to have taken place in Paris, and rumours of occasional recurrences of the disease in the vicinity of the capital have come to hand even up to within the last few weeks. How far such cases may be genuine, and capable of forming a connecting link between the late epidemic and any further recurrence of the disease this year, still remains to be seen.

The Outbreak at Yport.—A very instructive account has been published by Dr. Gibert of Havre, as to the limited but severe outbreak which occurred at Yport, a Norman fishing village. Up to the date of the occurrences to be related the department of the *Seine Inférieure* had been free from cholera, although under the circumstances of drought and exceptional temperature, there had been certain serious cases of the sporadic affection. On the 7th of September a vessel, the *Louise-Marie*, arrived at Cette, in the south of France, from the Newfoundland fisheries, and the crew, after a long term at sea, committed considerable excesses and contracted cholera, two of them dying in the hospital at Cette. Seven others were seized with specific cholera, but this did not prevent the crew from being allowed to land and traverse France by railway, without the adoption of any precautionary measures whatever. One of the crew named, Gigot was seized with cholera on the journey; he was removed from the train at Farascon where he died in hospital, but his baggage went on to Paris, where it was deposited at the Lyons terminus. Similarly the baggage of one of the men who had died at Cette was transmitted through France to Fécamp, where, however, it was burned. (Incidentally Dr. Gibert asks whether it is to occurrences such as these that the Paris outbreak was due.)

The remainder of the crew having reached Fécamp, they and their effects were submitted to a well-intentioned process of "disinfection," which being left to an ignorant sister of mercy instead of being carried out by an officer of a sanitary authority, turned out to be completely useless. Two of the men reached Yport on September 28th. One of them, Emile Bazile by name, had suffered from a choleraic attack at Cette, and the day after his arrival his clothes were, with the aid of his brother and his sister-in-law, rung out in water and hung up in front of the neighbouring dwellings, the slop-water being allowed to flow down the street. On the 4th of October the sister-in-law, then suffering from diarrhœa, washed out these same garments at the "fontaine," and on returning from her self-imposed task she was seized with all the symptoms of Asiatic cholera and soon died. Another woman died on October 8th, and five others succumbed before the 22nd. At this latter date the prevalence had become known and Dr. Gibert arrived from Havre.

According to the description given by Dr. Gibert, Yport is typical of the sort of place where cholera, when once imported, must almost necessarily spread itself. It has a population of 1,600 people, and the dwellings are grouped in a very restricted area near the beach. The principal street runs along a narrow valley, and it is intersected by a series of narrow bye-paths where in low dwellings, excavated in the sloping surface and having the natural soil for a flooring, the native fishermen and mariners live. In short, the rooms are little better than cellars, and their filthiness is said to defy description. It was in one of these wretched lanes that the slop-water from the cholera-infected clothing was allowed to ooze along, the result being that the disease spread from house to house. By the aid of measures of isolation, which consisted mainly in appropriating as hospitals some of the dwellings already infected, and by burnings and disinfections, the disease was at last subdued soon after the middle of November. Similar measures were taken on the disease being imported into Perthus, near Fécamp, by a woman who had nursed cases at Yport. The total attacks during this Yport prevalence amounted to forty-two, of whom eighteen died.

In connexion with this history Dr. Gibert points to the rumours which have circulated in France and in Paris as to the cholera prevalence of 1884 having been due, either to spontaneous origin or to aerial diffusion; and premising that a satisfactory conclusion on such points is much more likely to be arrived at as the result of an investigation into a limited outbreak in such a place as Yport, where every circumstance connected with the previous movements of the sick could easily be ascertained, than in such populous centres as Toulon or Paris, he lays down the following conclusions:—That cholera was imported into Yport. That it was imported by means of soiled garments insufficiently disinfected. That from the moment when these articles were washed, they became the agents of rapid and serious spread of contamination. That the cholera spread by means of contagion from house to house, and was traceable day by day, without there being a single instance that could be attributed to aerial transport of the morbific germ. That sanitary measures, although far from complete, succeeded in stamping out the disease. That the entire destruction of the discharges of cholera patients, together with the destruction or efficient disinfection of infected articles, appears capable of staying the spread of an epidemic which is as yet limited in its dimensions. That aerial diffusion appears to be an erroneous doctrine; and as to this he cites the fact that three sisters of mercy and three physicians or medical students lived for a month at Yport under circumstances most favourable to the reception of the contagion, and that it sufficed for their escape for them to take all their food at a distance from the sick, and to avoid all handling of soiled and damp garments, &c. Finally, he explains that the question of infection by means of water does not arise by reason of the fact that the inhabitants of Yport never drink any.

THE PRACTITIONER.

MARCH, 1885.

Original Communications.

ON THE USE OF ANTIMONIAL WINE FOR CERTAIN DISEASES OF THE SKIN; WITH NOTES ON ITS ADMINISTRATION IN COMPARATIVELY SMALL AND FREQUENT DOSES.

BY JOHN KENT SPENDER, M.D. LOND.,
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A THERAPEUTIC chord which had long slumbered was made vocal again when Mr. Malcolm Morris read a paper at the Liverpool Congress of the British Medical Association on the "Utility of the Tartrate of Antimony in the treatment of certain Diseases of the Skin." The theme had old-world associations; the sounds of contra-stimulation and *antiphlogiston* were in the air; and there rose to the vision seers and pundits of an ancient school, a school which is now supposed to be without teachers and without scholars. An old drug was re-clothed and brought to market. But why did it become old if it possesses properties which ought to keep it always fresh and new? Nothing of value would ever become old if we rightly understood all its powers, and adapted them to present needs. The present craze after new remedies springs partly from want of faith and partly from want of knowledge. Both the faith and the knowledge are kept bright here and there, and like an undimmed torch are handed on from fathers to children; and a study of some therapeutic books written between thirty and forty years ago will reveal to us treasures in our art which have become almost forgotten, and not a few have perished simply from lack of using.[1]

To help in the rescue of an almost extinct tradition, and to try and put it on a firmer basis, are some of the aims of my present paper. The history of tartrate of antimony during the last hundred years is an important chapter in the history of medicine. It would illustrate in an intense form the shocks and throes of human opinion, the violent changes of theory and practice which disturb all human effort when not governed by a sound philosophy. The contra-stimulant doctrine in vogue all over Italy at the end of the last century, and in France at the beginning of this, shows how wild even learned physicians may become when they cast off reason and despise experience. To *contra-stimulate* means, I suppose, to knock down; and when an alleged knocking-down medicine had been wrested out of Nature's mineral stores, it was thought that the process should be done savagely and thoroughly. There is not, however, a single potent weapon in our therapeutic armoury which may not do evil if misused, and do good if properly guided. The same engine which can crush can be also made to execute the finest work of the most finished craftsman. In Sir Henry Holland's *Medical Notes and Reflections* and in Dr. Billing's *First Principles of Medicine* there are important lessons of therapeutic power and refinement, and illustrations of the same substance having different attributes when handled in different ways. To the unlearned disciple this is one of the mysteries of medicine; but all Nature abounds in analogies, and the sun itself, the greatest cosmical force, is an example of one of the plainest scientific truths.[2]

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[1] I speak with gratitude of Dr. Nevins's *Translation of the New London Pharmacopœia*, published in 1851. I awoke it from a long sleep on my shelves a little while ago, and found it full of pencil-marks pointing to a number of useful things which helped me in my early days of practice, and many of which are valuable even now.

[2] Dr. Billing's book is a medical classic, in spite of its rambling method and a careless literary style. It was in advance of its epoch in many things, such as

For some years dermatologists of every school heard echoes of old empiric teaching, and in forgotten treatises on the practice of physic are prescriptions containing tartar emetic and tersulphuret of antimony, which were said to be good for scrofula chronic rheumatism, and skin affections. In a sort of muddled way, very alien from our present exact methods, diseases were sometimes bracketed together when they were supposed to obey that curious therapeutic discipline called *alterative*; and if a drug got the reputation of possessing such a property, it was reckoned a very precious thing and had some glorious traditions. The honoured names of Cheyne and Neligan are associated with the fame of antimony as a remedy for "skin eruptions;" and I have discovered a prescription with the signature of Dr. Walshe, in which the tartrate of antimony is combined with salts of magnesia in such doses as to suggest that the creed of "contra-stimulation" still survives.[1] But from the days when Plummer's pill (the *Pilula Hydrargyri subchloridi Composita*) was supreme for all sorts of diathetic conditions, there was an interval when tartrate of antimony faded very much from therapeutic vision, and certainly was little used for cutaneous diseases. Within a period of fifteen years there were published such important books as Dr. Dunglison's *New Remedies* (Philadelphia, 1851), the *Dispensatory of the United States of America*, by Drs. Wood and Bache (1854), Dr. Stille's *Therapeutics and Materia Medica* (Philadelphia, 1864), and the successive parts of Dr. Pereira's great work. In none of these books do I find a record of the tartrate of antimony as a remedy for any diseases of the skin. In the excellent manual of Drs. Royle and Headland, and in that of Dr. Waring, there is not even a distant allusion to the subject. Dr. Farquharson glances at it in a few words, and says

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the neurotic doctrine of rheumatism, which was advocated with much ingenuity and earnestness. I have the fifth edition, published in 1849. All Dr. Todd's clinical lectures which I heard at King's College Hospital between 1849 and 1852 were tinged with a strong humoral bias; and the scholastic theories of humoralism and solidism had at the same time their learned and enthusiastic champions.

[1] Dr. Waring states (*Manual of Practical Therapeutics*, 2nd edition, 1865) that Desault recommended tartrate of antimony for bilious erysipelas in one-grain doses, largely diluted, and that Dr. Walshe advised its use in similar doses for erysipelatous inflammation. No wonder that a remedy prescribed in such a way should fall into discredit!

that "antimonial wine has been prescribed in scaly skin affections," but that his own success with it has not been equal to that adduced by others.[1] Dr. Ringer says nothing about it (I quote from the last edition but one of his well-known *Handbook*), and Dr. Phillips acknowledges the utility of the medicine for acute eczema only when combined with "magnesia or other saline aperients, or with diuretics."[2] Dr. Tilbury Fox speaks of the efficacy of "small doses of antimony with ammonia" in the treatment of *eczema rubrum*;[3] but there is no reference to it in the rather hurried sketches of diseases of the skin annexed to Holmes's *System of Surgery*, and to Reynolds's *System of Medicine*.

Now what is there to prevent tartrate of antimony taking its proper place in the therapeutics of the skin? Is there any *a priori* objection? All authorities agree on the influence of that salt over acute bronchitic and pneumonic diseases. The physiological anatomy of skin and of mucous membrane is so far identical, that their pathology must be to a large extent identical too. In acute dermatitis and in acute bronchorrhœa there is the same proliferation of epithelium, the same wasteful flux of serous or sero-purulent fluid. Now if tartrate of antimony controls the one, surely it may control the other; the outside of a man is as delicate as the inside in its obedience to the same laws of growth and of decay; and we should see the analogy without difficulty if the characteristic features of diseases of the skin were not veiled under an artificial terminology, based upon fanciful resemblances to other things. Words and phrases, drawn from confused metaphors, should not allure us from tracing the hidden agreements of apparently different diseases, for the right use of many remedies may depend upon this. Tartrate of antimony has no partiality for any special texture; its eclectic power makes it helpful in stopping the evolution of the inflammatory process anywhere —equally in solid glands and on free surfaces. And as inflammation may occur wherever there are nerves and wherever there are blood-vessels, so the remedial force of tartrate of antimony is co-extensive with every tissue of the human body.[1]

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[1] *Guide to Therapeutics*, 3rd edition, p. 83.

[2] *Inorganic Materia Medica*, p. 375.

[3] *Skin Diseases*, 3rd edition (1873), p. 190.

But here the important principle steps in that we should aim to get all the good out of a medicine with as little as possible of its harm. For the very goodness of it connotes its certainty to do harm when misused. To label a medicine as "dangerous," or as a "poison," and then to write a moral essay on the sin of administering such a thing to a patient, is like telling the world that we do not understand the bare postulates of our art.[2] It is a confession of impotence, and acknowledgment of incapacity which is almost a shame. We are entrusted with engines of tremendous power, and we shout to the bystanders that we do not know how to use them. And yet the machinery of every one of these engines is endowed with exquisite delicacy of operation. Now my plea on behalf of tartrate of antimony is that it is a weapon of many grades of power; that although the traditions surrounding it are dark and deadly, they have come mainly from its use in wrong doses or at wrong times; and that the sound philosophy of the new therapeutic learning ought to guide us in this matter. From whence does the craze for new drugs arise, but because we do not carry into practice all that the old drugs will do? And why is antimony so put away from us, as if we feared to launch a force which we cannot control?

I will now relate a case which illustrates the title of my paper; and a comment will be added on the way in which the treatment was successful.

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[1] Our great English thinker, Samuel Taylor Coleridge, resembled Goethe in the happy audacity with which he sometimes started speculations outside his own large province of knowledge. Thus he says (*Table Talk*, May 23, 1830), "The study of specific medicines is too much disregarded now. No doubt the hunting after specifics is a mark of ignorance and weakness in medicine; yet the neglect of them is proof also of immaturity; for, in fact, all medicines will be found specific in the perfection of the science."

[2] An accomplished physician, to whose writings we all owe much, spoke at the Belfast meeting of the British Medical Association against the "dangerous tampering with the human organisation by strong agencies;" but this same physician seems to have been the author of a paper in the *Edin. Med. Journal* for April, 1860, in which he praises the use of antimony in the treatment of tubercular pneumonia. He gave "small doses of antimony with diffusible stimulants," notwithstanding weakness and exhaustion; and adds that antimony is "sometimes so well borne that I have given half-grain and even one-grain doses to patients who were so weak as to be utterly unable to raise themselves in bed!"

In October, 1883, a married lady, aged 52, and living in the southern part of Somerset, was entrusted to my care by my old King's College friend, Dr. Edward Liddon of Taunton. Before 1877 her health had been almost uninterruptedly good. In the autumn of that year she began to have psoriasis, mostly in the form of *psoriasis guttata;* the spots were dispersed over the body, although most thickly on the outer sides of the limbs; but on the upper arms and on the lower parts of the thighs there were a few larger patches. For this skin trouble she stayed in Bath for a few weeks under the direction of the late Dr. Falconer, and bathed nine times in the mineral waters. Arsenic was prescribed for her shortly after leaving Bath, but this did not prove so beneficial as Dr. Liddon expected, and ultimately she was cured for more than five years by the administration of "tar capsules."

In the summer of 1883 the psoriasis gradually returned, and was not now amenable to tar or any of the usual remedies. She was therefore advised to come to Bath, and bathing in the thermal waters was begun early in October. Two or three baths were taken every week, according to weather and other circumstances. The eruption was partial, and was distinctly most severe on the limbs; on the thighs were big patches, with scaly edges and red fissured centres; there was a look of *lichen agrius* here and there, and the same patch might vary in complexion from day to day. Even the intermediate sound skin was always floridly pink; and the face, although free from disease, appeared more or less congested. The forearms and backs of the hands were in the very thick of the trouble. Although the irritation was severe, my patient refrained as much as possible from scratching. The general health was in fairly wholesome order, except that the bowels were not sufficiently moved and the urine was sometimes scanty and turbid. As usual when we are somewhat out of our depths, the facile hypothesis of "gout" was welcomed as a solution of all enigmas; but the charm of words did not cure the disease.

Matters drifted on without much change until the end of November. The thermal baths were soothing in every way; but the area of affected skin was not lessened, and the prospect of recovery was as remote as ever. "Tar capsules" were prescribed again without the slighest benefit. One day, without warning, and only as the apparent result of a change of wind to a cold quarter, there was an acute and violent exacerbation of the disease; the hyperæmia of the patches became suddenly more intense; the "sombre red" deepened to a purple red, and the whole surface seemed verging on *pityriasis rubra.* Whence all this tumult? What made blood and nerves behave so unseemly all at once? There was little pyrexia; there was hardly any change of function; what did the storm mean?

It is useless to speculate on the misbehaviour of nerves and blood and skin. The outward and visible facts were before us, calling loudly for the sharp and decisive intervention of medical aid. The honour of medical art was at stake. It was hinted that some treachery in the Bath waters had aggravated the disease; that too many baths might have been taken; or that some medicine would have prevented the disaster. It was certain that personal confidence would be withdrawn unless immediate relief were afforded.

Firstly, then, the patient was kept absolutely in bed, and in a bedroom in which a uniform and moderate temperature was maintained both night and day. "Milk diet" was allowed without stint, with plenty of cooked fruit and vegetables. Aperient salines and diuretics were prescribed, among the latter being acetate of potash and wine of colchicum. This preliminary therapeutic skirmishing prepared the way for the chief thing to be done; I recollected and re-studied Mr. Malcolm Morris's paper, which seemed apposite to my present needs; but his proposed doses of tartrate of antimony struck me as inadequate, and administered at too long intervals. Securing the willing services of a lady friend, who promised precision and punctuality, we began our therapeutic task with a vigour and an enthusiasm which gave our patient courage and cheer, and were an omen of sure success.

On Dec. 1, 1883, twenty minims of antimonial wine were added to each dose of the previous medicine, simply as a test of the tolerance of the system for tartrate of antimony. This was repeated four times in the day. No physiological or other effect was perceived.

On Dec. 3, a mixture was prescribed containing in each dose fifteen minims of antimonial wine and fifteen grains of acetate of potash, with a few minims of compound tincture of lavender and chloric ether. This was taken every two hours from eight in the morning to ten o'clock in the evening—eight doses altogether. No sickness was produced, not even the slightest nausea; the solid and liquid food was relished as much as ever. On Dec. 5, and again on the 7th, the same medical orders were given; and fifteen minims of antimonial wine, combined as before, were taken every two hours during the daytime until twelve o'clock at noon on Dec. 10. On this day a longer interval was allowed between each dose; and during eight days (namely, from Dec. 10 to 18) twenty minims of antimonial wine were taken every three hours, or six doses during the daytime. On Dec. 18 four doses were ordered during the day hours. My patient left Bath for her country house on the following day, with instructions to leave off the medicine by degrees, and to take at least two doses daily until her return.

Now what was the result of all this therapeutic business, obediently begun and loyally carried through? Literally there was no interruption whatever to a perfect recovery. On Dec. 7, the sixth day of the treatment, the change for the better was so marked as to surprise and please the patient; the hyperæmia was greatly diminished everywhere; and irritation was so far relieved that sleep was possible and existence was no longer a burden. By the 10th of Dec. the desquamation had ceased, and only dark red spots marked the places where the acute exfoliative process had gone on. These stains lessened in tint, became in their centres more like the neighbouring skin, and on the 19th (the day my patient left Bath) resembled the purple hue of a fading *erythema nodosum*. Permission was given to the convalescent to come down stairs a few days before her journey. A few doses of Carlsbad salts were necessary, because the confinement within doors caused some constipation of the bowels. When she came back to Bath she said that she "was quite well;" and now (Jan. 1885), after a lapse of nearly fourteen months, she has never seen a speck or spot on any part of the body.

Toxically, this patient suffered no more than if she had taken so many rations of cold water. To the many inquiries about nausea, the same answer was always rendered, that she felt nothing at all. The tartrate of antimony produced no sensible physiological action. Though I prohibited food within an hour after each dose when the doses came so frequently, the precaution seemed superfluous. Elimination of the medicine must have been free, because the urine was abundant, and never contained albumen. Imprisonment in bed was ordered at first, to ecônomise vital force, and to prevent the possibility of a "chill." I find that a few minims short of seven ounces of antimonial wine were consumed altogether, equivalent to very nearly fourteen grains of tartrate of antimony; and the administration of this quantity was spread over about seven weeks.

Now I believe that the whole secret of our therapeutic success lay in this germinal principle, the prescription of comparatively small and frequent doses. Any attempt to do the work on other lines would have met with stern physiological resistance, and probably with the still sterner resistance of the patient if she found that every healthy function was outraged by a medicine presented under a remedial disguise. But for the condition of things with which I had to do battle on December 1, what else could have been done? Was there any other rational scheme of medication possible? No outward means promised any benefit; nor could I have expected submission to a complex system of ointments and lotions, when immersion in the Bath waters had been proved so unequal to the emergency. All other considerations being decided in the negative, there remained only that fine ancient "antiphlogistic" medicine, Antimony, celebrated by Sydenham and a host of the old masters. Nearly eighteen years ago I illustrated the thesis that tartrate of antimony may be given to an adult person every hour in the dose of $\frac{1}{16}$ of a grain, and repeated from sixteen to twenty times, with the certain result (barring very rare contingencies) of utterly dissipating an early local inflammation.[1] In this manner one grain may be taken not only without causing the least poisonous commotion in the body, but sometimes without even the physiological ripple of an excess of sweating.[1] The local disease (or threatening disease) is removed without the *toxic disease of the medicinal agent* taking its place. And all other things being the same, a metallic salt may thus work with certainty and safety, and its effect may be calculated with almost mathematical precision and definiteness.[2]

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[1] *Brit. Med. Journal*, 1867. The subject is fully developed with regard to a number of drugs in my paper entitled "On the Administration of Medicines in comparatively Small and Frequent Doses," contributed to the *Brit. and For. Med. Chir. Review*, Jan. 1872.

Measured by the heroic theories and practice of half a century ago, this exposition of the proper method of prescribing tartrate of antimony may seem poor and tame. Does any one push it aside because it has been spoken of as a monster and a terror, too big to be guided by any helm, even when that helm is in the most experienced hands? To any such I quote the words of Dr. Barnes (when writing on quite another subject), *do not be afraid of Power.*[3] Now power means *certainty,* if we know how to wield it. The absolute certainties of medical art are mournfully few; and we ought so much the more to cherish those we have. When we are able to raise a sick man from the dull levels of "I hope to do you good," or, "Perhaps you will be relieved some day," or the empty formula, "The weather is against you," he is inspired with amazing confidence by the firm and welcome news, "Barring unforeseen contingencies, you are going to be quickly cured." And the bounds of our therapeutic knowledge are enlarged if it can be shown that active hyperæmia of the skin (whether dry or catarrhal) can be controlled by a medicine which has very different associations, but whose affinities are so wide that it can quell the same pathological mischief wherever it exists.[4]

There is a tradition that Basil Valentine, who was a German Benedictine monk, made a number of experiments with antimonial preparations on his brother monks, all of whom were injured and some were killed. Hence (they say) the origin of the word *antimony*. Dr. Paris, in his well-known *Pharmacologia*,[1] relates that during the fifteenth and sixteenth centuries antimonial remedies were renounced with all the virulence of party spirit. The secular power was invoked, and in 1566 a French edict forbade the use of antimony as a medicine. For nearly a century it was under a cloud, and not until 1650 was antimonial wine restored to public favour and general reputation. Worldly opinion may not go so far now as it did then, and persecute those doctors who dare to prescribe an unpopular remedy. But smiles and frowns should be equally disregarded when our duty lies clearly before us. To bring back good old things which have fallen into partial oblivion, not because they are old, but because they have been misapplied, is to fulfil one of the functions of a true medical philosophy. The armorial motto of the modern physician is that the Creator has provided infinite medicines for the healing of man; and in using our materials our working legend may appropriately be—Do not be afraid of power.

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[1] Pope puts it with epigrammatic neatness—

"As poison heals, in just proportion used."

[2] An example of one of the four experimental methods of J. S. Mill, the *method of difference.* It is the essential nature of this method to introduce into the pre-existing circumstances a change perfectly well-defined. *System of Logic,* i. 399.

[3] Lectures on Obstetric Operations.

[4] On the early use of antimony in surgical cases, see a paper by Dr. H. Payne in the *Brit. Med. Journal,* May, 1884.

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[1] Ninth edition (1843), pp. 72, 73.

SOUTH AFRICA AS A HEALTH RESORT.

BY H. C. TRULL.

FEELING strongly upon the subject of utilising the climate of this country in cases of weakness of the chest, after a somewhat lengthened experience I write upon it in the hope that my remarks may so commend themselves to the judgment of your readers that much general good may be the ultimate result.

I have now lived in Bethlehem for three years. I came here in very poor health, after again trying vainly to live in Durban. I had been here only a very short time when I began to regain my health and spirits. I have led an active business life ever since. I have married, and have a bonny child. So much for my own case—in brief.

Effect of Climate upon Consumptives.—I know men who came here in such a state of utter collapse that they could merely lounge into one's house, seek a chair or couch, and —— cough. Two of those men are Wesleyan parsons; they remained here for a couple of years, and are leading active lives elsewhere. Another is engaged in business here, and apparently exists on the very purity of the air, as he appears to have been doing for many years. But I can quote such cases *ad infinitum.* I would rather put before you some facts relative to the place.

I have tried the climate of many parts of South Africa—I have endeavoured to believe the pretty places with the most social comforts to be the healthiest: Wynberg, Sea Point, &c., at the Cape; Durban, Maritzburg, &c., in Natal—but three years ago, upon my return from England, I was obliged to take the bull by the horns and put myself 5,000 feet above the scenery of the coast and all its comforts, and determine to settle down, at least for a fair time, to the comparative monotony of these upland plains.

Suitability of this part of South Africa for Consumptives.—I am now confident in saying that this State, and particularly this district of the State, is the spot peculiarly adapted for all persons threatened by consumption, or those already attacked, providing the disease has not progressed too far; and it is my desire to do all in my power to let the fact be known.

Former Drawbacks.—Heretofore there have been two great drawbacks to Bethlehem as a health-resort—first, the difficulty of getting here (for invalids), and secondly, the absence of domestic or medical comfort upon getting here. The near approach of the railway has materially lessened the first, and the second can no longer be complained of. The trains now run from where the steamers arrive in Durban to within a couple of days' drive of Bethlehem.

Doctors.—We have now two physicians here—Dr. Krause (a continental M.D.), and Dr. Reid, of Trinity College, Dublin, and a very pleasant little English society has for some time been forming itself among us. The language of the Government officers is of course Dutch, as is also that of the surrounding farmers, or "Boers," but the town is eminently English in language and in tone.

The Town.—There are now three churches, a fairly important branch of the Bank of Africa, two or three schools, two good hotels, and so on.

Social Life.—If there is any "caste" indulged in I think it is regulated by our education or good-fellowship, certainly not by our callings; for it is quite possible that our parsons and hotel-keepers graduated at the same university! We are almost entirely dependent upon ourselves for our pleasures, as is the case in most villages, and to this end we are establishing a capital subscription library and other similar institutions. We have good shooting, riding, driving, tennis, theatricals, concerts, &c., &c.

When I came here three years ago in an ox-waggon, after a sixteen days' journey from Pietermaritzburg, there were scarcely any of these things; yet had the journey been longer and more tedious, and the place more destitute of amusement or society

I should have done wisely in braving these things to insure the very life and energy my weakened lungs were inhaling at every breath.

Outfit.—The clothing, &c., required here is just what it is in England (excepting black silk hats and kid gloves !).

Climate.—It is bitterly cold in winter and exceedingly warm in summer, only the cold is clear, and bracing, and dry, and the heat is ditto, and ditto, and ditto. No fog, no damp, no miasma, no drizzling rain. We have an occasional hot wind, and we have any quantity of dust and disagreeables of all sorts, but only disagreeables that try our tempers, not our constitutions. Unlike the coast, it is almost always cold at night in summer, whilst even in winter-time the days are sunny, warm, and bright.

To those in search of the beautiful in nature (or art), I certainly could not recommend the Free State, but to those who would willingly give up these things for a season in the well-grounded expectation of renewed health and energy, I say—*Come.*

Occupation.—I have been obliged to earn my living here, and have been able to do so, being engaged in one of the usual "store" businesses of the country—importing general goods and buying wool and general produce for export ; still business is comparatively dull in the country at present, the Boers do not seem to be flourishing particularly, and occupation of any sort is not easily obtained ; abject poverty, however, is unknown, except amongst the lazy or intemperate. I am afraid that those who are dependent upon themselves for their livelihood, will scarcely find this the country to come to, nor will it be so for some time, unless there were some institution provided for their reception and maintenance, at least until health and opportunity should make them self-supporting.

Sanatorium.—In the meantime, however, there is undoubtedly every reason why there should be a sanatorium or health resort for the more affluent classes. Such a place, properly managed, should prove not only a boon to those for whom it would be intended, but also a financial success. It should commence with a properly-appointed, comfortable building, nicely situated. It should have its own conveyances to and from the railway terminus, and be made in every way a cheerful residence rather than a hospital. I should very much like to see such a place started here, and I should much enjoy superintending its arrangements and speeding its success.

There are thousands of men and women doing the rounds of the prevailing fashionable health resorts only to return whence they started—disheartened, sorrowful, sinking. Let such be able to find a comfortable resting-place up in this pure, even bright atmosphere after an easy voyage and journey!

Dr. and Mrs. Reid's Private Home.—In the meantime, let me say that my friends Dr. and Mrs. Reid have informed me that it is their intention to put such an idea as mine into immediate operation. Their venture, however, is to be of a private nature, and they intend commencing by accepting ladies and gentlemen as inmates of their house—members of their own home (which is a wonderfully cheerful one and well appointed in every way). I believe the Doctor intends to make his charge (inclusive of all domestic and medical comforts) 200*l.* per annum. Medical men may be glad to know of such a resort, and might confidently recommend it to any of their patients in search of such a desirable means to the wished-for end.

ON THE INTERNAL ADMINISTRATION OF TURPENTINE IN CUTANEOUS DISEASES.[1]

BY H. RADCLIFFE CROCKER, M.D., M.R.C.P.

Physician to the Skin Department of University College Hospital; Physician to the East London Hospital for Children.

No one can be more sensible than myself of the fact that a large proportion of the diseases of the skin are an external expression of a defect of some part of the internal economy, and that the rational treatment of all such cases lies in the removal of that defect by appropriate measures, with such local applications as the skin eruption may require, and no intelligent practitioner would attempt to remove a gouty eczema or other eruption, for example, by arsenic or any other so-called specific.

On the other hand it can scarcely be denied that the skin may, like the other organs, take the initiative in disease, or while an eruption may have been originally produced by an internal derangement, yet after the removal or subsidence of the internal cause, the skin having acquired a bad habit, so to speak, does not recover the moment the original cause is removed, but either remains diseased, or prone to be so on very slight provocation, such as changes in weather, climate, etc. In these cases we may fairly resort to those drugs which have a direct action upon the skin.

Finally, there are cases which are probably secondary, but either from our ignorance of the patient's surroundings, or from other defects in our knowledge, we are unable to detect their primary cause, and we are driven as a refuge of the destitute to resort to specifics.

The number of drugs at our disposal which have any direct influence upon the skin are but few in number. Arsenic rightly holds the first place, and then at a long interval come sulphur, antimony, chrysophanic and carbolic acids, and one or two others of still more doubtful utility. Arsenic acts upon the epidermis chiefly, and it is not well ascertained how the others affect the skin.

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[1] Read before the Hunterian Society on January 14, 1885.

I hope to-night to establish the claims of the turpentines to be added to this meagre list, and though the one I have made most use of is ordinary oil of turpentine, probably they all have a very similar action. They are not, however, put forward as a "perfect cure," but they reduce the hyperæmia and place the patient so far on the way to recovery that a short supplementary local treatment easily removes the remains of the lesion.

I had used this drug as an external application for psoriasis for a long period, and in properly selected cases have met with marked success, and finding, that like chrysarobin, when rubbed into one side of the body the other side also improved, I was led to give it internally. The result surpassed my expectation, and I offer to you to-night the report of my investigations.

As a good example of what it can and cannot effect I will relate in some detail the treatment adopted in a case of psoriasis of great extent and long duration, because it is at once a good test of the utility of the turpentine and also because it illustrates the precautions to be observed with a drug so powerful for good and evil. The patient having been in the hospital, its effects could be closely watched.

Job G., æt. 69, was sent to me by Dr. Griffiths, of the Harrow Road, suffering from general psoriasis of six years' duration; his general health was very good, he had never had any serious illness, there was no evidence of the disease being hereditary, and both parents lived to a very advanced age. He attended as an out-patient *once*, and was prescribed ♏x of ol. terebinth in an ounce of mucilage of acacia; he was admitted into the hospital on January 20th, 1882. The whole surface of the body and limbs was covered with the white scales of psoriasis, except the head and face, the backs of the hands and small areas here and there on the trunk and flexures of the limbs; large continuous sheets of eruption occupying the back and thighs; the palms, soles, nails of fingers and toes were severely affected. There was a small white smooth patch on the dorsum of the tongue to the left of the raphe, but no evidence of past syphilis. The bowels were habitually loose, acting usually two or three times a day, sometimes oftener. The urine was perfectly normal but he did not pass a great deal, doubtless due to the chronic looseness of the bowels. On the 20th he was given 15 minims of ol. tereb. in emulsion of acacia three times a day; on the 24th ♏xx, on the 26th ♏xxx. The urine was measured from this date, and the record stands thus:

Jan.	26th . . .	Ol. Tereb.	♏xxx.	ter die.	Urine	32 ozs.	
,,	27th . . .	,,	,,	,,	,,	21 ozs.	
,,	28th . . .	,,	,,	,,	,,	20 ozs.	
,,	29th . . .	,,	,,	,,	,,	35 ozs.	
,,	30th . . .	,,	♏xl.	,,	,,	26 ozs.	
,,	31st . . .	,,	,,	,,	,,	14 ozs.	
Feb.	1st . . .	,,	,,	,,	,,	4 ozs.	2 pints of barley water was then ordered per diem
,,	2nd . .	,,	,,	,,	,,	30 ozs.	
,,	3rd . .	,,	,,	,,	,,	30 ozs.	
,,	5th . . .	,,	,,	,,	,,	28 ozs.	
,,	6th . . .	,,	,,	,,	,,	28 ozs.	
,,	7th . . .	,,	l.	,,	,,	20 ozs.	
,,	8th . . .	,,	,,	,,	,,	44 ozs.	
,,	9th . . .	,,	,,	,,	,,	24 ozs.	
,,	10th . . .	,,	♏lx.	,,	,,	43 ozs.	
,,	11th . . .	,,	,,	,,	,,	44 ozs.	
,,	12th . . .	,,	,,	,,	,,	38 ozs.	
,,	13th . . .	,,	,,	,,	,,	25 ozs.	
,,	14th . . .	,,	,,	,,	,,	32 ozs.	
,,	15th . . .	,,	,,	,,	,,	20 ozs.	
,,	16th . . .	,,	,,	,,	,,	27 ozs.	
,,	17th . . .	,,	,,	,,	,,	48 ozs.	

During this period the urine was daily examined for blood and albumen, none was ever found, but it possessed a strong violaceous odour. According to the patient's statement, except when there was the great fall to only 4 oz. before the barley water was ordered, he passed as much as usual, and he had no difficulty or discomfort during micturition.

With regard to the skin, at first it was difficult to note any change, though it was thought that there was rather less scale-formation. On Feb. 3rd it was noted that the white scales were not so adherent, and the subjacent skin was less hyperæmic. On Feb. 10th, the left thigh, buttock, and arms were quite devoid of large crusts, and in other places they were easily detached, while some patches began to clear up in the centre.

On Feb. 12th he complained of not feeling quite well, and had a slight headache, but there was nothing else definite except that the tongue felt a little sore. On Feb. 17th all this had passed off. The area of the diseased skin was not materially diminished, but there was great decrease of hyperæmia and scales.

The patient wished to leave on some private business, and was therefore dismissed, but he was re-admitted on Feb. 28th, *i.e.*, eleven days later, having continued the turpentine in ʒi doses while away from the hospital. The improvement was now very striking; large areas of previously affected skin were now quite free, leaving the skin only somewhat thickened. There was still a good deal of eruption left, but not one-sixth part of what there was on his first admission; the palms were quite well, but on the feet both dorsum and soles were still affected. The eruption that was still present was more patchy and very much less hyperæmic, but there was a long line half an inch in width, or rather more in parts, down from the sacral region to half way down the thigh, the margin of a large patch which had cleared; here and elsewhere what scaly crusts there were came off with only a touch. On March 3rd, as the improvement had only slightly progressed, the dose of turpentine was increased to 75 min. This was an unfortunate step. On March 7th the urine was noted to be cloudy with albumen on boiling; the dose was dropped to 50 minims, but on the 8th there was a quarter of albumen and a little blood detected by the microscope and by the guaiacum test. The turpentine was therefore stopped, though the patient experienced no discomfort; on the 9th the albumen was less and there was no guaiacum reaction, and on the 10th the albumen had all gone. While the albumen was present he was passing five motions a day, and the amount of urine could not be measured accurately in consequence. After the large dose of turpentine was stopped the number of motions diminished to the usual number of three a day. The skin remained stationary except that perhaps the scales were rather less detachable. It was not thought desirable to resume the turpentine for a time, and the condition was such that the rest of the psoriasis could probably be removed by local measures. This, however, the patient refused to submit to, as he had suffered so much in former hospitals by baths and external treatment without benefit. He knew, however, that the turpentine had done him good and would go on with that, but as I adhered to the external treatment he went out, the urine still smelling strongly with the characteristic violet odour, though he had had no turpentine for five days; in other respects it was quite normal. During the whole period of the treatment no external means were employed. At first sight this case may appear unsatisfactory, as turpentine did not completely remove the eruption, this however was not to be expected; in a case of such long standing there would always be some secondary changes which would require local treament for their removal; but the improvement was so remarkable and that within so short a time in a most unpromising case, that no one who watched the patient could doubt that the improvement was due to the drug employed.

The experience of the treatment of thirty other cases of psoriasis by the same means proves that the result in the above case was not a mere coincidence; in most of them no external treatment was used. In a few the psoriasis has been completely removed, but in most, considerable improvement has been manifested up to a certain point, when, as in the selected case, some external treatment was required for the complete removal of the disease. Except when it is desirable to test accurately the effect of a drug, combined external and internal treatment from the commencement will always give the best result.

All the thirty cases were taken consecutively without regard to the extent or duration of the disease or to the general health—a plan I would by no means recommend for general adoption, but it is the one best calculated to show when it should or should not be given, whilst if the judgment is derived from the results of picked cases alone exaggerated expectations may be raised, which end in disappointment, and perhaps the rejection of a really useful treatment. In only two cases was I obliged to discontinue the drug on account of slight strangury, and in three others the dose has had to be diminished on this account; one of these was a girl who could never hold her water more than two hours. These were in the early stage of my investigations when I did not so well know how to obviate these unpleasant symptoms.

In all these cases the dose was under 20 minims, and the irritation was not considerable, with the exception of one who did not attend for a fortnight, and kept on with the medicine in spite of the irritation, and here there was bloody urine which, however, stopped in a few days after the drug was discontinued. In three the drug had to be discontinued on account of dyspepsia, which the turpentine aggravated, and I never give it now where there are any symptoms of gastric irritation. In one it was left off because it had no effect on the disease, but in this case both arsenic in full doses, and chrysarobin internally, had previously failed.

In my earlier cases I did not go beyond 20 minims, and did not in some cases get as much benefit as I afterwards obtained with larger doses. In all except the six alluded to there was some improvement, in a few only slight, but in most very decided. In several cases there was a decided increase of itching in the eruption at first, a symptom often observed with arsenic also, but with perseverance for a week or two longer this entirely ceased. Besides the well-known violet odour imparted to the urine, it was noticed that a copious deposit of urates occurred during the first few days of the treatment, but this soon passed off and appeared to be entirely due to diminution in the quantity of water. In four cases estimations of the total acidity of the twenty-four hours' urine for a few days before and after the turpentine was given were carefully made by my clinical clerks, Messrs. Barker and de Cordova, but the variations in normal urine from day to day were so considerable that it was impossible to come to any definite conclusion about it, except in one case, in which the urine was only slightly acid, but there was a diminution in quantity and the specific gravity increased up to 1·035, so far confirming the view that the temporary increase in the urates is due to diminution in the watery part of the urine.

I will now relate a case of eczema in which it was tried. John Pratt, gardener's boy æt. 16, a well-developed lad whose general health had always been good, had suffered from general eczema in patches, distributed more or less over the whole body and limbs, for eighteen months. He knew of no exciting or predisposing cause, no departure from health except the eczema could be detected, and he had been treated from the commencement of the disease by local medical men with various ointments, lotions, and mixtures. Since the onset of the eruption, though some patches have disappeared, they have been replaced by others, and on the whole the extent of the eruption has not materially altered. He was admitted into University College Hospital on March 14th, 1883. The eruption was in large irregular patches, discharging freely, and much crusted in parts, affecting nearly the whole of the legs and arms, and, to a less extent, the face and trunk.

He was ordered 15 minims of ol. terebinth in an emulsion, three times a day after food, and to drink at least a quart of barley water; the next day, he not having had any barley water, there was some pain on micturition and frequent desire to pass water; the urine was dark yellow, strongly acid, contained a trace of albumen, and a large deposit of mucus and urates. March 16th, eruption less irritable and drier; he had been drinking barley water freely, and there was less discomfort on micturition. The next day the urine was clear, the eruption less red and drier, and from that time the discomfort on micturition ceased, although the turpentine had not been discontinued. The eruption continued to improve, but on March 24th, as improvement was slow, the dose was increased to 25 minims. A week later there were some fresh vesicles on the wrists and forehead, and the axillary glands were slightly swollen, but the rest of the body was much better; on April 4th he took 30 minims, and about a week later about 40 minims, but as this produced some discomfort the dose was reduced again to 30 minims. He continued to improve on the whole though he had occasionally a few fresh papules, and on April 27th all active disease had disappeared on the face, neck and trunk, and there were slight remains of the eruption on the arms and legs. As the turpentine had now done all that could be expected, it was discontinued, and local treatment only with diluted ammonio-chloride of mercury and calamine lotion removed the last trace of the eruption, and he was discharged well on May 9th.

This case shows the importance of beginning the barley water as soon as the turpentine is given, and now I never allow my patients to begin the medicine until the barley water is ready.

Besides the above, I have used it in about a dozen other cases, most of them in-patients; I confess that I did not anticipate much good from its employment, as I expected that any irritation of the intestine or urinary tract would aggravate the eczema, but in this I was agreeably disappointed. The cases were not taken indiscriminately as those of psoriasis, but were selected from such patients as presented no obvious disturbance of general health, some of them being boys who had suffered from eczema for years. The cases were kept in bed, and most of them first placed upon a placebo for a few days, as the change into hospital is often beneficial, and then the turpentine was not given until they ceased to improve or were even going back. They all began to improve at once when the turpentine was given; some got quite well, in others some thickening remained in the places longest diseased, and these were removed by local treatment, but no local or other treatment was employed while they were taking the turpentine.

For eczema, therefore, I would restrict its use to those cases in which no defect in the general health can be detected—a small proportion of cases undoubtedly compared to psoriasis, which Hebra called "a disease of the healthy"—but it is just these uncomplicated cases that puzzle us as to what line of treatment is most likely to prove successful, and I think turpentine will help us out of the difficulty. With regard to other diseases of the skin, the evidence I can offer at present is only fragmentary, but that is favourable as far as it goes. In a case of pityriasis rubra, Chian turpentine was given in 5, increasing to 15 grain doses, three times a day, and the skin distinctly improved; but the patient, as so often happens in these cases, became so adynamic, not from the drug, but from the natural course of the disease, that other treatment had to be resorted to. Turpentine is a well-known remedy for purpura, but I have no new facts to offer on this point.

Thinking that perhaps the much-vaunted Chian turpentine for cancer might have had some foundation for its ephemeral reputation, and that the ordinary turpentine being much more readily absorbable might act beneficially, I asked my friend Mr. Gould of the Middlesex Hospital to try it in some cancer cases; at present he has given it in two cases only, one epithelioma, the other scirrhus, and his report is that both patients experienced relief from pain, and that the growth was apparently retarded, and this is not irrational, considering its supposed action on the vessels in diminishing their calibre.

I hope that others will try it and report the effect. I should imagine it was less likely to benefit a slow-growing scirrhus than a more rapidly developing form, but only experience can decide this; and although I would on no account put it forward as another "cancer cure," yet if it relieved pain and retarded growth in only a moderate degree it would be so much clear gain.

The cases in which turpentine is contra-indicated are, in my opinion, the following: children under five years old; all who have unsound kidneys, or irritable bladders; most cases in which dyspepsia is present, though in some instances it can be tolerated even then; and gouty subjects, whose powers of elimination are seldom good.

The physiological action in moderate doses is considered to be that of a stimulant of a powerful kind to the inhibitory reflex centre, and to the vaso-motor centre, thereby raising the blood-pressure, and contracting the arterioles. This is doubtless its *modus operandi* in inflammatory diseases of the skin; the arterioles which are abnormally dilated at the seat of the inflammation have their calibre diminished, and the inflammation is, so to speak, starved out. It might therefore be expected to be useful in most diseases in which this feature is prominent, and it is therefore not in any sense of the word a specific, and fails to remove thickening and other consequences of long-continued inflammation, which are best attacked by local measures. Like arsenic also, it fails to prevent fresh eruption even during its administration, but this again is only what we might anticipate from its physiological action. The mode of administration may be gathered from what I have already said, but it is so very important that I will recapitulate it. For adults and children over ten years I begin with not more than 10 minims, rubbed up with an ounce of mucilage so as to form an emulsion. This is given directly after meals three times a day, and the last dose should not be given within three hours of bed-time; in two of my cases there was slight discomfort on micturition in the morning when the last dose was taken after supper, but none when the last dose was not later than six o'clock. This is probably due to the proportion of turpentine in the contents of the bladder being much greater when it has been accumulating all night, whilst some of it is got rid of at the last micturition when the dose has been early in the evening. Another means of avoiding irritation of the urinary organs is to make the patient drink barley water freely from the very commencement of the treatment, and I never give turpentine without impressing upon the patient the necessity of frequent diluent drinks.

It may be remembered that in the first case related the urine was reduced to 4 oz. whilst taking 40 minim doses, but was immediately raised to the patient's usual quantity when a quart of barley water per diem was given. In a few cases the drug was given in capsules, but I am inclined to think the emulsion is less liable to disagree, and I was surprised how few patients even among children made any serious objection on the score of the disagreeable taste. If the improvement is only proceeding slowly, or the condition is stationary, and the patient is tolerant of the drug, I increase the dose by 5 or 10 minims at a time up to 30 minims a day, unless the disease is obviously improving with the smaller dose. I seldom find it necessary or desirable to go beyond this, though in three cases I have gone up to drachm doses without any ill effects ; but the risk of albuminuria or even hæmaturia increases considerably after thirty-drop doses are reached, though if the drug be stopped as soon as these symptoms appear, in two or three days the urine will have returned to its normal condition.

Although I have limited my remarks to the employment of turpentine in diseases of the skin, its utility is by no means confined to this class of affections, but for its other uses I would refer those who would know more of " a good old remedy out of fashion " to a very interesting article by Dr. Warburton Begbie, in the Sydenham Society's Edition of his collected works edited by Dr. Dyce Duckworth, in which its very strong claims to our attention are most ably set forth.

I hope the profession will not be deterred from giving this useful drug an extended trial on account of its occasional irritant effects on the urinary organs, but those who try it will, I trust, give it with the precautions that I have indicated, and then these unpleasant effects will almost certainly be avoided, and they will be convinced that this irritation is a bugbear rather than a reality, except in a very few instances in which, from abnormally slow elimination or other idiosyncrasy, the drug is not tolerated at all; and if only a small dose be used at first it can never, even then, produce more than temporary inconvenience. Whatever the results may be in the hands of others I hope they will report them, and "nothing extenuate, nor set down aught in malice." I am satisfied that then turpentine will lose its blood-stained reputation and establish its claims to an honourable position as a therapeutic agent.

SHORT NOTES ON THERAPEUTICS.

BY H. MACNAUGHTON JONES, M.D., F.R.C.S.I. AND ED.

Examiner in the Royal University of Ireland.

(*Continued from* p. 95.)

In any brief survey of general therapeutical principles to be followed in the treatment of affections of the eye, we cannot omit a reference to cleanliness and the use of antiseptics. Cleanliness in ophthalmic surgery has a wider significance than the mere ordinary acceptation of the term would suggest to the mind of the surgeon. It is not merely the enforcement of attention to such commonly observed rules as the prevention of over-crowding in schools, the isolation of infectious cases, the care bestowed on those who may convey disease through personal contact, either by touch or clothes, as in the case of children in nurseries or dormitories, by the hands of nurses or otherwise. But cleanliness here implies a much wider acquaintance with the causation, etiology, and prophylaxis of a large class of eye affections.

It is easy to establish the truth of this statement. We may best do so by instancing some of the diseases in which contact and want of cleanliness play an important part in causing or aggravating the affection, and in which the recollection of this fact and the observance of prophylactic and curative measures based on that knowledge will assist us both to prevent and cure. By this relation of contagion and the accumulation of purulent and infective discharges to the occurrence and spread as well as the virulence and fatality of certain eye diseases, we necessarily are reminded of the presence of micro-organisms in conjunctival discharges, in the tear passages, in the palpebral folds, in the pus of corneal ulcers and hypopyon. As in the ear so in the eye, we have operating all those influences which attend on fermentative and septic changes. In the dust and floating matter of the air we have present the germs which find in the inflammatory processes occurring in the exposed structures of the eye most suitable soil for multiplication. This is partially true of the corneal cement, and necessarily more so when its surface is abraded or its substance invaded by an ulcer or severed by a wound. We know that an intra-ocular septic lesion may result from embolism, the consequence of bacterial plugs, which have been disseminated from septic tissues in some remote part. Such plugs have been found in the retina and choroid. On the other hand we have in the case of jequirity ophthalmia an example of a non-infective agent (jequirity-infusion) inducing an acute inflammation in the discharge from which will be found no bacillus, but a non-organic ferment (Klein), and in the production of which inflammatory process organisms take no part. And in our every-day experience of catarrhal attacks of the conjunctiva we have ample evidence of severe inflammatory attacks which can have no relation to septic or pathogenic organisms, yet which, in many instances, cannot be attributed to such exciting causes as cold, foreign body, or injury. Here it probably is the entrance of some ferment which alights on a tissue at the moment prone to inflammatory change. All our knowledge of the mode of development of these minute organisms tends to prove that it is the special environment in which any particular form is placed that secures its growth or death. Susceptibility may be determined by the then state of the blood in the ocular tissues. That which readily excites pathological change in one eye may be harmless in another. It is a matter of individual pre-disposition.

It is through a wide appreciation of the bearing of such facts on ocular therapeutics that we can estimate the importance of cleanliness in the treatment of the eye. There is, in the first instance, the cleanliness secured by attention to any small sponges used in the application of washes or fomentations, and the systematic disinfection and cleansing of these. Great carelessness is often shown in private houses in the use for days of a sponge, without any precaution being taken to remove some lurking discharge, impure remains of fomentation or lotion. If sponges are used it is well that they should be occasionally boiled and soaked in some disinfectant solution. Secondly, the fact is overlooked that alkaloidal and other solutions after a few days are frequently rendered impure through the formation of fungi and the decomposition of the fluid. This is true of all the ordinary astringent remedies and often of the alkaloids. It happens, no matter how carefully we cork the bottle in which the fluid is kept. I have quite recently seen in a small well-corked bottle of cocaine solution, which I happened to lay by for some days, the collection of a comparatively large quantity of fungus. The same occurs with the ordinary solutions of the sulphates of atropine and eserine and the muriate and nitrate of pilocarpine, also with duboisine and gelseminine. It does not happen to the same extent, even when the solutions are left open, with the salicylate preparations, especially that of eserine. In the case of the expensive alkaloids this is a vital objection to the prescription, for poor patients, of any but the smallest quantities. It was with the object of counteracting this defect that I endeavoured to improve on the well-known drop bottle with the glass tube of Mr. Liebreich. I found the alkaloids quickly decomposed in it. The cork favoured after a time this decomposition. There was no protection from the action of the light. There was considerable waste. In the drop bottle made for me by Messrs. Maw, Son, and Thompson (Braithwaite's Retrospect, 1884), the glass is coloured either blue or yellow. The vulcanite stopper fits air-tight with its flange of rubber; and the little vulcanite pipette, permitting only one drop to pass, is protected by a small cap. It will be found that alkaloids may be preserved for a considerable time in such a bottle. The heat of the hand is sufficient to expel the fluid.

The carelessness which overlooks the presence of fungi in eye lotions or in alkaloidal solutions may cost an eye. How important it is to remember this fact in using drops after operations, or eye washes in abraded states of the cornea, it is not necessary to point out. Boiling and filtering small quantities of the suspected lotion is the best means of securing the purity of the fluid. Thirdly, we often find that chance is taken for the transmission of infection from an affected eye to the fellow one, as in the case of specific inflammation, purulent conjunctivitis, croupous or diphtheritic attacks, or even in ordinary catarrhal conjunctivitis of a severe character. To place a small piece of antiseptic linen (boracic acid) over the eyelids, lightly closed with thin strips of isinglass plaister, wet with a carbolic (1 per cent.) solution and to secure it to the skin with collodion, while we place over all a thin layer of salicylic wool and fix it with some ordinary adhesive plaister or a dressing bandage, is no difficult task. Yet how often might the precaution to do so have saved the second eye. Injurious effects also follow the wearing of eye-shades, which occasionally press on the eyelids and collect discharges and secretions. In the treatment of severe conjunctivitis of a simple catarrhal, purulent, diphtheritic, or specific type, in the discharges resulting from lacrimal inflammation, in dacryoscystocele, in ophthalmia neonatorum, we have typical examples of affections in which the first and most essential therapeutic indication is cleanliness.

In that most fatal of affections, acute blenorrhœa of infants, how many times might we not save sight by the precaution of using an antiseptic vaginal wash regularly before labour, combined with careful attention to the eyes of the infant and the application of antiseptic ointment (carbolised vaseline) and lotion (boracic acid) from birth.

When we are consulted for the acute affection the first and most important step is to ensure hourly gentle washing out with an antiseptic wash of the discharge which so readily accumulates, and to insist to the mother that the chance for the child's recovery of vision depends on this extreme cleanliness. I use the carbolised compound alum wash. This should be combined with the employment of eserine. The nurse should gently syringe the eyes without distressing the infant or pressing on the globe. Or a stream may be directed on the eye by holding a small sponge at a little height from it. The eyes should be daily inspected by the surgeon. The stop speculum or retractors in opening the eyelids must be used with caution.

Ulcers rapidly form, tending to perforation, which a little undue pressure or straining may rupture. I believe the best application to be nitrate of silver solution (five to ten grains to the ounce). This is applied to the cleansed conjunctiva, previously dried with a little cotton wool; after a delay of a minute it is washed off with a weak solution of chloride of sodium. It is well to apply it daily while the discharge continues. In those troublesome cases of blepharitis attended with follicular inflammation and discharge with crusting, the first step to recovery is made when we ensure cleanliness through paring of the cilia down to the palpebral margin, and careful and repeated sponging off of all crusts. It is seldom we fail to cure this disease rapidly if we carry out this step. It exposes the orifices of the follicles both meibomian and capillary. We can thus the more effectually apply any ointment or solution. It is in these cases as in tinea tarsi that avulsion of the eyelashes is at times indicated. The ointment composed of ung. hydrarg. nit. gr. iii., pulv. hydrarg. nit. ox. gr. iii., acidi arseniosi gr. $\frac{1}{3}$, ol. amygdali gtt. x., vaseline ʒi., is a most useful one in this and other palpebral conditions. So is the white ophthalmic ointment of acetate of lead (gr. $\frac{1}{2}$), oxide of zinc. (gr. iii.), spermaceti ointment (mildly carbolised 1 in 200) ʒi., while *white* vaseline and oil of theobroma are also valuable media for ointments. Vaseline I have found occasionally irritating to the eye. This may be attributable to impurity. It has occurred when only simple vaseline has been used as a salve for the eyelids. Fresh butter, if the ointment be occasionally renewed, is an admirable basis.

Pediculi are occasionally found in the cilia of the eyelids; paring the lashes, enforced cleanliness, and the use of the mildest mercurial ointment is sufficient to effect a cure. Though not strictly coming under the head of cleanliness it may be no harm here to insist on the importance of suspecting the presence of a foreign body either in the cornea or under the upper eyelid in any case of sudden inflammation. Many times it has occurred to me to discover undetected foreign bodies of various kinds, either lying concealed in the palpebral fold or embedded in the substance, which have been the cause of severe pain, conjunctivitis, or corneitis. Even concealed cilia will give rise to much annoyance. Some years since, I removed a piece of stick over two inches in length which had passed completely under the conjunctiva into the orbit and lay there for some months. The child was brought with considerable redness and some conjunctival swelling. On everting the eyelid, as is my general practice, I found a hard-pointed substance projecting under the palpebral fold. On incising this, to my astonishment, I withdrew the piece of stick. The only explanation the parent could give me was, that some months before the child was struck in the eye by a playmate with a small bush. It became red and inflamed, but on the use of some simple lotion the inflammation subsided. They paid little more attention to it, though the eye was never quite like the other, while lately it commenced to be irritable and the inflammation increased, and for this advice was sought. This case is instructive and teaches its own lesson. I may here observe that a minute foreign body in the cornea will escape detection unless the eye be most carefully examined for it by a good light. The objective ophthalmoscopic examination is, perhaps, the best. After removal of a foreign body there is nothing more soothing than a few drops of castor oil, followed, if necessary, by the application of atropine. The instant eversion of the eyelids, thorough cleansing of the entire palpebral conjunctiva, and the free use of very dilute acetic acid, affords the only chance of preventing corneal mischief after the entrance of lime. Here, also, castor oil may be freely applied and atropine instilled. Through a severe epidemic of small-pox in 1871 (in which over sixteen hundred cases passed under my personal observation), I only saw two eyes lost from corneal complications. At that time I used a carbolised cream of zinc and almond oil for the face, and paid special attention to all confluent cases by constant dressings to the eyelids. In later cases I used vaseline with carbolic acid, or 1 in 1,000 of thymol. Obviously, the prophylactic measure here is cleanliness and the use of some antiseptic, as carbolic acid or boracic acid. In operations on the eye, I believe in the adoption of antiseptic measures, so far as they can be followed. No doubt, previously existing discharges (Streatfeild) influence the healing of wounds, and such should be cured before operating for cataract. It has been my habit for some years to sponge the eyes with carbolised water before operating, to dip the knives and instruments in the same, and to use the linen dressing dried out of boracic acid solution. Though, theoretically, our faith in the virtue of such weak antiseptic solutions as those we are able to employ in the treatment of affections of the eye may not be strong, in practice such antiseptics as carbolic acid (¼ to ½ per cent.), salicylic acid (½ per cent.), boracic acid (½ per cent.), either as washes, or ointments, are valuable and essential agents.

There is yet another consideration materially affecting the indications for special local remedies in diseases of the eye. I allude to the *constitutional states* which either cause or complicate abnormal ocular conditions. Obviously our prognosis, and much of our success in dealing with many local affections will depend on the correct appreciation of the influences operating both in producing and aggravating these. This influence on treatment can be best realised if we classify the most important morbid states of the eye which are induced by diseases of remote organs. Taking first the *digestive system*, we find as the result of diabetes, cataract, iritis, retinitis, optic neuritis, retinal hæmorrhage. Gout causes conjunctivitis, iritis, retinitis, hæmorrhagic infarctions. Diarrhœa and dysentery induce cataract. Hepatic congestion and icterus bring about various visual aberrations, retinal hyperæmia and hæmorrhage. During dentition occur phlyctenular states of the conjunctiva and cornea, lenticular degenerations, while later on from caries of the teeth arise different reflex disturbances, as for example mydriasis and myosis, amblyopia. The pupil is also affected and retinal congestion may arise from the presence of intestinal worms. When we turn to the *circulatory system*, we find arterial and venous pulsations in the retinal vessels, retinal hyperæmia, hæmorrhage, infarctions, detachment, embolus of the central artery, thrombosis, and optic neuritis, as the results of cardiac disease, principally mitral valve disease and hypertrophy. Aortic and other aneurysms, and atheromatous states of the arteries, cause retinal apoplexies and intra-ocular hæmorrhage, and are occasionally accompanied by myosis or mydriasis. Albuminuria has following in its train retinitis albuminurica, papillitis, retinal hæmorrhage and detachment, hyalitis and hæmorrhage into the vitreous, glaucoma, and optic atrophy. Anæmia, chlorosis, and leukæmia, in their aggravated and pernicious forms, are occasionally attended by papillitis, hæmorrhage, and embolus of the central artery Embolus may also accompany violent hæmatemmesis, hæmoptysis, or menorrhagia. Ovarian and uterine disorders are the sources of retinal mischief much more commonly than is suspected. The derangements most likely to affect the eye are—ovaritis, suppressed, irregular and excessive menstruation, uterine tumours, and the pregnant state. The latter condition, through the low tension or high tension of the blood vessels, the existence of albuminuria, the excess of fibrine, the excessive reflex irritability of the nervous system, is productive of all the complications which result from the albuminuric state, while retinitis and optic neuritis, hæmorrhage, embolism, hyalitis, are occasionally caused by ovarian and menstrual derangements.

It is perhaps in the ocular indications of morbid changes in *the nervous system* that we find the most striking proof of the value of the ophthalmoscope in general medicine. The names best known in the United Kingdom as pioneers in original work in this field of research are those of Drs. Hughlings Jackson and Gowers. Taking in the first instance the three cerebral diseases, meningitis, degeneration, tumour, we note as the result of all three either mydriatic or myotic states of the pupil, the consequences of paralysis (ophthalmoplegia interna) or irritation. Meningitis is frequently attended by retinitis or optic neuritis; and amaurosis if it be of a tuberculous nature. Degeneration brings about symptoms which, like tumours, are dependent upon the situation of the degenerative change. If in the cortex, early neuritis; about the angular gyrus, hemianopia and diplopia; if involving the fourth ventricle and the third nerve, ophthalmoplegia externa and ptosis, to be followed, it may be, later on, by atrophic changes in the papilla or perhaps absolute blindness, with other proofs of bulbar paralysis. Brain tumour has as its sequence ptosis, optic neuritis (so-called "choked disc") optic atrophy, and paralysis of the ocular muscles. Of cerebellar tumour optic neuritis and atrophy, if accompanied by staggering gait, are pathognomonic.

Abscess may bring about similar results. Optic neuritis is a frequent attendant on epilepsy, and optic atrophy a consequence of the pressure of hydrocephalus. A small cerebral apoplexy will occasionally bring on rapid ocular symptoms to be followed later on by more confirmed ones, as the degenerative changes increase in the nerve tissue. In the instance of the spinal cord we find the characteristic white atrophy of tabes dorsalis, following, it may be, optic neuritis as one of the early signs of the disease, while oculo-motor symptoms, ptosis, and paralysis of the ocular muscles are also occasionally present. In other degenerative conditions of the cord, as in sclerosis of the columns of Goll and disseminated sclerosis, there are, in some instances, optic neuritis and optic atrophy.

In traumatisms of the cord retinal hyperæmia and papillitis are not so uncommon, and the significance of their presence in cases of "railway spine" is well known. Dr. Gowers has most perfectly analysed and grouped[1] the ocular troubles in general paralysis of the insane, pointing out the proportion of cases in which paralysis of accommodation, reflex iridoplegia, and cyclopegia were present, while he shows that the spinal symptoms were not specially associated with the graver ocular troubles.

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[1] *Transactions of the Ophthalmological Society*, vol. iii.

(*To be continued.*)

RESEARCHES RELATING TO THE PATHOLOGY AND TREATMENT OF CHOLERA.

BY T. LAUDER BRUNTON, M.D., F.R.S., AND P. H. PYE-SMITH, M.D.

(*Continued from* p. 122.)

We have now finished the first part of our paper by reprinting the papers we had previously published, and we now come to the questions of the pathology and treatment of the disease as they at present stand. Perhaps the easiest and clearest way of doing this may be to take the questions proposed by Koch in the Conference on cholera held in Berlin last July. These are :—

1. Is cholera produced by a specific infective matter which comes only from India ?

2. Is the infective matter conveyed only by human intercourse ?

3. What are the means by which it is conveyed in distant intercourse : ships, wares, letters, healthy persons, infected persons ?

4. What are the means by which it is conveyed in close intercourse : corpses of those who have died of cholera, choleraic dejecta, clothes, food, drinking water, water for household use, air, insects ?

5. Is the direct transference of the infective matter possible, or must it undergo a kind of ripening or alteration of generations in the soil or elsewhere ?

6. Is the infective material reproduced in the human body or independently in the soil, in which case do men or animals serve only as means of conveying it ?

7. Is the infective material contained in the dejecta or in

the vomit, or does it occur also in blood, urine, sweat, and expired air?

8. Has the infective material much power of resistance, and can it pass into a resting state?

9. Is it destroyed in a short time by drying?

10. Can the infective material enter the body in other ways than through the alimentary canal?

11. Is a special individual predisposition requisite in order to allow the infective material to become active?

12. How long is the stage of incubation?

13. Does recovery from one attack of cholera give protection for a certain time against another?

14. Is the infective matter of cholera identical with the (so-called) "comma" bacillus?

15. Can the mode of action of the bacilli be regarded as a poisoning?

16. Is the discovery of the comma bacillus applicable to diagnosis?

We will now take the questions in order:—

1. *Is cholera produced by a specific infective matter which comes only from India?*

We do not know that this question can be answered better than by the following extracts from the *Report to the Local Government Board* by Mr. Netten Radcliffe, which is reprinted in the *Practitioner* of May 1882, page 393, containing the conclusions of the International Sanitary Conference at Constantinople (1866):—"Affirmed unanimously that cholera is not a disease native to Europe; that the various epidemics of the malady which have devastated the world have always proceeded from India, and have been easily traced back to their source; that there is no satisfactory evidence which proves that cholera exists in a permanent state anywhere except in India, whence have radiated the epidemic streams which have spread over the world; and that the disease is transmissible from man to man, propagated in a special manner, and diffused in proportion to the frequency of human intercourse."

These conclusions were reaffirmed by the Conference of 1874 in Vienna, so that they may be taken as expressing the opinion of those most qualified to judge on the subject.

2. *Is the infective material conveyed only by human intercourse?*

The Conference of 1866 was "of opinion that cholera is the product of India; that it accompanies man in his migrations; hat it is carried in all directions by his agency only, and in rapidity corresponding with his movements; and that it develops itself most severely in those places which abound in bad sanitary conditions."

The Conference of 1874 reaffirmed this conclusion, but assigned somewhat greater influence upon the development of the disease locality. The conclusion unanimously adopted was that "cholera is transmissible by man, coming through an infected medium, but man is not considered as the specific cause apart from the influence of the locality. He is regarded as the propagator of cholera when he comes from a place where the germ of the disease already exists."

3. *What are the means by which it is conveyed in distant intercourse: ships, wares, letters, healthy persons, infected persons?*

The Conference of 1866 came to the conclusion that "by means of discharges from cholera patients, whether the attack be exceedingly severe or so slight as to be hardly recognisable, articles of clothing, houses, and ships may become polluted, and form media for the retention or transmission of the poison; but, although possible, this cannot be affirmed of merchandise or animals."

With reference to the particular mode of transmission of the disease the conclusions adopted were to the effect, "that cholera was transmissible equally in its slightest and scarcely recognisable forms as in its most characteristic form; that its transmission was not necessarily, or even ordinarily, by direct communication of the sick with the healthy, but indirectly and chiefly by pollution of the air, the soil, and the water supply, with the discharges from the sick; that such pollution is especially favoured by those unhealthy local conditions which observation has shown to intensify cholera epidemics."

The Conference of 1874 considered that although proof was wanting of the transmission of cholera by merchandise or by animals, the possibility of such transmission should be admitted. They concluded that cholera can be transmitted by clothing, linen, bedding, &c., coming from an infected place, especially if they have served for the sick from cholera, and certain facts show that the disease can be carried to a distance by these articles if shut up so as to prevent free contact with air.

4. *What are the means of conveyance of the infective matter in close intercourse: corpses of those who have died of cholera, choleraic dejecta, clothes, food, drinking water, water for household use, air, insects?*

The Conference of 1874 considered that although it was not proved that cholera corpses can transmit cholera, it is prudent to consider them dangerous. The cholera dejecta were regarded by the Conference of 1866 as containing the infective material, and this conclusion is still accepted. The Conference of 1874 concluded that cholera can be propagated by drinks, particularly by water. It appears probable that cholera is conveyed by linen and food only in so far as they are contaminated by cholera dejecta. The Conference of 1874 concluded that no fact is yet known which proves that cholera can be propagated to a distance by the atmosphere alone, whatever its condition. The surrounding air, they say, is the principal vehicle of the generative agent of cholera, but the transmission of the malady by the atmosphere in an immense majority of cases is restricted to the close vicinity of the focus of emission. From this conclusion Koch entirely dissents, and thinks that air alone is never the means of conveying the infective matter; that it is so quickly destroyed by drying that the only chance of its being carried by the air is when it is distributed by water in the form of spray. But even if we accept his conclusion that the infective material is destroyed by drying it seems quite possible that it may sometimes be conveyed by the air in the form of dust: for it is easy to imagine that particles of dust though dry outside, might contain a little imperfectly dried infective material in their interior. Koch thinks that the reason why undertakers' men engaged in the burial of cholera corpses are more liable to the disease than doctors or nurses attending cholera patients is the greater chance of their food being contaminated by cholera poison, by their sometimes eating in the mortuary. He thinks that the disease may not only be conveyed by drinking water, but also by water used for household purposes, such as for washing vegetables. If this water is contaminated by cholera dejecta, the poison may adhere to the surface of the vegetables and remain there in a state of activity for some time. He thinks that flies may also be instrumental in spreading the disease by alighting first on some contaminated material and then upon articles of food, to which they convey the infective matter.

5. *Is the direct transference of the infective matter possible, or must it undergo a kind of ripening or alternation of generations in the soil or elsewhere?*

In the Conference in Berlin this point was not discussed. Koch thinks that the dejecta are infective immediately after they are passed, and that linen becomes infective as soon as it is soiled by the dejecta. The assumption that fresh cholera stools are not infective, but become so after exposure, is based to a considerable extent upon the experiments of Tiersch and of Sanderson, who found that mice fed with pieces of blotting paper soaked in fresh cholera dejecta remained uninjured, but when fed with paper containing dejecta which had been kept for some days, the animals died. Koch has repeated these experiments upon mice with negative results, the animals all remaining well, whatever the condition of the cholera stools might be. He has also experimented on monkeys, cats, fowls, dogs, and other animals, but has never seen anything like cholera produced. Similar results were obtained by pure cultivations with the comma bacillus, which he believes to be the cause of the disease. In regard to this point it must be noted that mice are very susceptible to poison, and considering the contradictory results obtained by Tiersch, Sanderson, and Koch, we must bear in mind the possibility that in the experiments of the former authorities, the mice died from poisoning by the products of decomposition of the cholera dejecta, and not in consequence of any specific poison present in them. The products of decomposition might vary according to the nature of the food which the person had been taking before the attack, and if the patient had been previously on a diet containing a considerable proportion of animal food, the decomposing dejecta might be much more poisonous than if the patient had been previously on a vegetable diet. This is a point, however, on which further experiments must be made in order to decide it.

6. *Is the infective material reproduced in the human body, or does this happen independently in the soil, and in that case do men or animals serve only as means of conveying it?*

There is general consensus of opinion that the poison is reproduced and multiplies within the human body, and can be conveyed from one to another without any contamination of the soil. But in addition to this it is probable that the infective material may increase in the soil or in water containing a certain amount of organic matter; the infection may thus remain apparently dormant for a while, and no cases of disease occur; yet after some time a fresh epidemic may break out, from the introduction of the poison into the human body from the soil or from the water.

7. *Is the infective matter contained in the dejecta or in the vomit, or does it occur also in blood, urine, sweat, and expired air?*

This is a question which cannot at present be answered definitely. It is most probable, from the comparative immunity enjoyed by nurses and doctors in close attendance on cholera patients that infective matter is not present in the respired air or in the sweat. It is probably present in the vomited matters as well as in the dejecta. The examination of the urine in cholera patients is one which requires much further investigation, and as we shall by and by show, may be of very great interest in regard to the pathology of the disease.

(*To be continued.*)

Reviews.

Intestinal Obstruction: its Varieties, with their Pathology, Diagnosis, and Treatment. By FREDERICK TREVES, F.R.C.S., Cassell & Co. 1884.

THE importance of this subject is apparent in the fact that over two thousand individuals die every year in England alone from obstruction of the bowels, exclusive of hernia which is not considered here. This volume contains in substance the Essay to which the Jacksonian prize was awarded in 1884. The method of classification is based upon pathological anatomy, namely, by the grouping together of instances of intestinal obstruction which are pathologically alike.

In the opening chapters on strangulation by bands, made by isolated peritoneal adhesions or formed from the omentum, one of the most common causes is shown to be an adhesion about a hernia. The various ways in which bands may form and lead to obstruction are described, and here as everywhere we are much assisted by the clear figures and diagrams. More than a dozen pages are devoted to strangulation by Meckel's or the true diverticulum due to the persistent or incomplete obliteration of the vitelline duct; this is followed by an account of the curious hernial protrusions of the mucous membrane of the bowels through the muscular coats called false diverticula. The cases that come under the category of strangulation by bands or through apertures form no less than one-fourth of the total number of cases of intestinal obstruction. Excellent in every way are the accounts of kinking, matting, volvulus, intussusception, and stricture. Every important case up to the most recent date is quoted in these and in the chapters on obstruction by foreign bodies, gall-stones, calculi, concretions, fæcal masses, chronic constipation, and ileus paralyticus. The diagnosis is especially well given, with as little repetition as possible, in a separate section. "Many of the errors in diagnosis are due to an incomplete investigation," and Mr. Treves shows how to make it systematic and thorough. Finally, on the treatment, he finds "feeding" placed first as of vast importance in all sub-acute cases. Nutritive enemata are strongly advised, and copious injections of fluid into the rectum to relieve the distressing thirst. If the colon is involved the vomiting is usually less severe; in such cases, if tenesmus prevent enemata, food may be given by the mouth.

"In acute and sub-acute cases of obstruction, the question of feeding resolves itself into this; the patient may have ice to suck to relieve his thirst, but apart from this all food should be administered, if possible, by the rectum, and in any case this method of taking nourishment should be persevered in so long as it can be carried out." After praising opium for the relief of the painful symptoms due to disordered peristaltic movement of the bowel, we have the necessary caution of the practical writer, namely, to avoid masking the symptoms by the drug, "no better rules can be adopted than those which guide the surgeon in strangulated hernia."

Few cases such as are described in this work are not greatly aggravated by the use of aperient medicines; only cases of fæcal accumulation admit of this treatment, and then with caution and combined with enemata. Mr. Treves gives us a careful abstract of M. Martignon's paper on the use of metallic mercury, and decides that "in any case of fæcal accumulation that had resisted the action of aperients, enemata, massage, electricity, &c., the use of metallic mercury in large doses would appear to be worth trying, as this mode is attended by no especial risk."

In describing the various operative proceedings, the median incision in laparotomy is advised, protrusion of the bowels being prevented by sponges; the hand is then to be introduced to make a systematic search, and if the large bowel is not the seat of obstruction the region of the cæcum and the pelvis is to be explored for a *collapsed* loop and this guides to the obstruction. This method has found an able advocate in Dr. J. K. Fowler in his report of Mr. Hulke's case.

The reader will find in addition all the most recent information on enterotomy, colotomy, and resection with figures on the clamps and sutures used in this last triumph of abdominal surgery.

Bodily Deformities and their Treatment; a Handbook of Practical Orthopædics. By H. A. Reeves, F.R.C.S.E., etc. Crown 8vo, with 228 Illustrations. London: H. K. Lewis. 1885.

If this work is to be regarded as "dealing with orthopædics in its modern sense," to use the words of the preface, we must confess to an inclination to see the subject treated in the manner of the older school. Almost the only subject which can be said to receive adequate attention is that of Genu valgum, and this part of the work is mainly the account of Mr. Reeves's own success with a particular operation. The special indications which should lead one to have recourse to surgical in preference to instrumental interference are not clearly laid down; nor, by the way, is any reference made to the dangers of producing too much movement in the knee, and, if the instrument is not carefully employed, of converting the lower leg into a mere flail. One would imagine that such results must have come under Mr. Reeves's notice more than once. Perhaps no better index of the practical value of this work can be found than the accounts which are given of such simple affections as Talipes varus and equinovarus. Let any one compare them with the account given by Little, and he will soon learn where he can best get information of a kind that is likely to have a really useful bearing on his practice.

Mr. Reeves gives no clear statement as to what age should be selected for tenotomy. Even in regard to the operation itself we miss the precise directions which are found in Mr. W. Adams' papers; and in place of directions we are confronted with a huge catalogue of slight varieties, both of operations and operators, which can only confuse the reader. The difficulties of putting on a Scarpa's shoe, and its liability to produce sores unless the utmost care is employed, is never even alluded to, whilst we learn that the effective and cheap substitute of plaster of Paris is to be employed only in the severest cases which have resisted all other treatment. The length of time during which the apparatus should be used after tenotomy is only briefly touched upon.

We cannot conclude without giving a passing mention to the diagrams. Some are mediocre, and some bad, and some are quite unique curiosities. We refer as examples to pages 156 and 171, and to the section on congenital encephalocele (apparently a new conquest of orthopædics), which is said to be represented at page 322. This first of a new series of brief practical handbooks is not encouraging.

Clinic of the Month.

Perifolliculitis in Plaques.—Dr. Leloir describes a new variety of perifolliculitis, which although not mentioned by authors, is yet, he believes, of frequent occurrence. The affected portion of the skin is elevated to the extent of two to five millimeters, the borders are sharply limited, and the *plaques* vary in size from a threepenny piece to a florin. The surface is red, sometimes bluish red. If the crusts are removed the surface is sometimes smooth, sometimes, on the contrary, slightly mammillated, never papillomatous. It is perforated by a number of small orifices varying in size from the point of a large pin to that of the head of a small pin. Many of these small apertures are plugged with thick pus. It is exceptional to find hairs. In addition to these small apertures numerous yellow points are observed, which in their turn will become apertures when the surface over them gives way. These points correspond to glandular apertures. There is little local and no general reaction produced by the *plaques*. Dr. Leloir has observed eight cases. They occurred on various parts of the body but never on the palmar or plantar regions. The lesion is usually single; sometimes there are two *plaques*, rarely three. The disease is an inflammation of the glands of the skin, and its etiology is obscure. In two cases micrococci were found in the tissues. The affection arrives at its full stage of development in about eight days and disappears under treatment as a rule within fifteen days. (*Annales de Dermatologie et de Syphiligraphie*, Vol. 5, No. 8.)

The Treatment of Lupus.—Professor Schwimmer states that after a trial of all the remedies which have been recommended for lupus, he has found the best results from the employment of mercurial plaster in conjunction with the use of pyrogallic acid. He remarks that the number of patients affected with the most malignant forms of lupus who were subjected to this treatment, and who remained under careful observation until its close, amounted to twenty. The following was the course pursued with all of them. For several days after admission the diseased surfaces were kept completely covered with vaseline smeared on cloths, in order to facilitate the removal of all secondary morbid products, such as scabs, &c. A ten per cent. pyrogallic ointment was then applied over the same area, and renewed two or three times in twenty-four hours. This dressing was employed from four to six days, or in cases where the cutaneous tissues were insensitive, for six or seven days. On its removal vaseline was again applied for one day, after which the entire suppurating surface was covered with mercurial plaster. Healing began in from ten days to a fortnight in most localities, but isolated nodes and tubercles could still be detected in the cicatrised integument. Pyrogallic acid was now once more applied for three or four days, causing renewed suppuration of the partially healed infiltrations, while those more firmly skinned over remained unaffected. When treatment was repeated, so much pain in many cases was experienced on the second day that mercurial plaster had to be at once substituted for the ointment; but if this was not the case, the latter was left on for two or three days longer. The grey plaster was allowed to remain, being changed once daily if the suppuration was trifling, twice or thrice if it was more profuse—until cicatrisation was complete, which sometimes required four weeks. When the complaint was peculiarly indolent and obstinate, the same process was gone over a third time, but treatment never extended further than this. He adds that the severest and most extensive forms of lupus—those hitherto most difficult and frequently impossible of management—may often be essentially ameliorated by these simple and comparatively painless procedures. (*Journal of Cutaneous and Venereal Diseases,* Vol. 2, No. 9.)

Too frequent Washing of the Stomach.—Bianch (*Gaz. degli Osp.* 1884, No. 25) describes a case showing the bad effects of washing out the stomach too often. A patient suffering from obstinate gastric catarrh was almost completely cured by washing out the stomach. After his discharge he went home and washed out his stomach himself, at first thrice a day, and then two hours after every meal. He thus removed his food before it could be absorbed and became extremely emaciated in consequence. Michælis (*Berlin. klin. Wochenschr.* 25, 1884) gives the case of a man where washing out the stomach brought on hæmatemesis so violent and continuous that the patient became completely collapsed and unconscious. He was restored by the intravenous injection of half a pint of solution of common salt. Leifert (*Centralblatt f. klin. Med.* 34, 1884) rightly remarks that one would not wash out the stomach in cases of recent gastric ulcer, but in long-standing cases of dyspepsia without definite symptoms the stomach must be washed out notwithstanding the risk of occasionally meeting with a case like that of Michælis. This remark is perfectly just. In some cases of long-standing catarrh all treatment by drugs fails, and one is obliged to resort to washing out the stomach, for this operation sometimes gives relief when everything else has been tried in vain. Recent cases showing this are recorded by Beverley Robinson (*New York Med. Journ.* April 19, 1884) and D'Ardenne (*Rev. méd. de Toulouse*, xvii. p. 289).

Empyema in Childhood, and its Treatment.—In an article on this subject, Dr. V. Simmonds first considers the relative frequency of purulent pleuritic exudations in childhood. A large number of the cases are secondary, very frequently after scarlet fever, and frequently after lobar and lobular pneumonia, in consequence of disease of the bony walls of the thorax, from purulent degeneration of the lymphatic glands, traumatism, pyæmic processes and tuberculosis. Of 100 cases, 31 followed pneumonia, 14 scarlatina, 12 tuberculosis, 8 measles, 6 traumatism, 5 typhoid fever, 2 caries of bone, 2 each pertussis and diphtheria, and a perforating hydatid cyst of the liver; 26 cases were primary. Of 240 cases, 140 were males, 100 females, 130 were five years old and under; 82 between five and ten years of age; 38 between ten and fifteen. Of 175 cases, 103 were of the left side, 65 of the right, and 7 bilateral. The prognosis depends very much on the primary affection, and on the state of the child's health. Uncomplicated cases in well-developed children give a good prognosis, especially in those cases in which an operation is not performed, and in cases of perforation of the lung, which does not always lead to pneumonia. Aspiration, as deciding between infiltration and exudation, is a very valuable aid in the diagnosis, and pricking of the lung-substance under antiseptic precautions is not injurious. If purulent exudation be found operative, interference is positively indicated, provided perforation into the pulmonary substance has not taken place, and circumstances favourable to spontaneous cure are not present. Even after perforation an operation should be performed if the exudation does not decrease, or becomes putrid or if the general state of the child does not improve. Simple puncture and aspiration is the most uncertain method of operating. Of 48 children treated by this method, 10 recovered independently of the operation, the majority from perforation of the empyema into the bronchi; 20 required more than one operation and were then treated by other means; 16 recovered; 6 were not benefited, and 6 died. Simmonds recommends the following operation; A trocar of 6 mm. calibre is introduced, a Nélaton's catheter quickly pushed through it, the canula withdrawn and the catheter tied to a glass tube, the external end of which is connected with a rubber tube, and this carried into a vessel containing borax water. After the deformity of the thorax is reduced the catheter is fixed, about six inches of it being in the pleural cavity. He has treated eight cases by this method, with six recoveries on the 19th, 28th, 29th, 31st, 47th, and 49th days. Of the two fatal cases one died of general tuberculosis, the other, a weak six-months' old child, of broncho-pneumonia. Simmonds always aspirates in the anterior or middle axillary line, in the fifth or sixth intercostal space. (*Centralbl. f. d. gesammte Therapie*, September 1884; *Medical News*.)

Gastritis Favosa: A New Disease.—At the meeting of the Vienna Imperial and Royal Society of Physicians on the 28th November Professor Kundrat exhibited specimens of a unique kind. The case was one of favus universalis which had given rise to an abscess of the thigh, and had terminated fatally from severe gastro-intestinal disorder marked by an uncontrollable diarrhœa. Numerous erosions mingled with diphtheritic swellings were found in the mucous membrane of the stomach, and the intestines contained some foul putrescent masses and much mucus. Professor Kundrat at once declared the diphtheritic swellings to be due to the favus fungus, a view which was confirmed on microscopic examination. This is the first recorded instance in which the mucorineæ have been the cause of death, as it is the first of favus of the stomach and intestines. Indeed, the naked-eye appearance of the tumours in the stomach closely resembled the favus cups on the skin, and the fact that but little of the fungus was found in the intestine was explained by Professor Kaposi by their having undergone putrefaction in the bowel. The patient had previously been shown to the Society by Professor Kaposi as a rare instance of favus, which covered the entire body, affecting even the finger-nails (attributed to his habit of scratching himself constantly). Favus of the stomach is as unknown a condition in animals as it is in man; at any rate, Professor Csoker, of the Vienna Hospital for Animals, stated that it never occurred in cats, although these animals frequently eat rats infested with the fungus. Professor Bamberger suggested that in this case the gastric mucosa was in an unhealthy condition at the time of infection, thereby affording a favourable nidus for the growth of the fungus. It must be borne in mind that the mucorineæ, unlike the schizomycetes, can thrive in acid liquids, and may therefore grow with impunity in the stomach. The case is of great importance, as showing that if they do gain access to the interior of the body, these fungi may be a source of danger and lead to a fatal result, thereby disproving the usually accepted notion of their harmless character. (*Lancet*, Dec. 6, 1884.)

Repair of Tendons after destruction.—At a recent meeting of the Berlin Medical Society, Dr. Gluck reported on a patient whom he had shown to the Society in February, in whom the tendons of the extensor communis digitorum and the extensor indicis had been destroyed in consequence of a phlegmonous affection at the back of the hand. Dr. Gluck replaced the tendons by a plait of catgut fibres, extending from the metacarpo-phalangeal articulation to the transverse dorsal carpal ligament. The operation had succeeded perfectly, the functions of the missing tendons being now completely performed—ten months after. He also showed another patient, aged 76, on whom he had performed the same operation, rather less extensively, but with equally good results. He believes that the "irritation of function" exerts a regenerative influence on the catgut, so that, instead of being absorbed, it becomes organised. He has tried a similar experiment with divided nerves, by stitching one extremity to each end of a decalcified bone drainage-tube, with the result that they have become united. This method has been recommended also by Dr. Vendoit, of Liège, and called by him "névrotisation du tube osseux." Dr. Gluck strongly recommends both operations. (*Brit. Medical Journal*, Jan. 10, 1885.)

Traumatic Tuberculous Pleurisy.—An instance of isolated tuberculous disease of one pleura is reported from the Clinic of Professor von Bamberger in Vienna which presents features of considerable interest in relation to the pathogenesis of tubercle. A man, aged 43, a confessed drinker, was struck on the left side of the thorax by a wheel. Pain, cough, and other symptoms of pleurisy rapidly showed themselves. The patient, in whom no inheritance of tubercle could be traced, presented when first examined all the physical signs of left-sided pleuritic effusion. The sputa and blood were carefully examined, but no trace of bacilli could be discovered. The case progressed unfavourably throughout, fever, cough, and dyspnœa becoming daily worse. Thoracentesis was delayed by the patient's obstinacy till a month's illness had materially depressed his strength and Cheyne-Stokes respiration had set in. The operation gave but little relief, and death ensued from œdema of the lungs. The autopsy performed by Professor Kundrat proved the existence of extensive effusion into the left pleural cavity, the walls of which were lined by a thick false membrane studded with nodules of tubercle of the size of millet seeds. The left lung was completely compressed, but no tubercles could be discovered within it, nor were they to be found in any of the other organs of the body. By the microscope the nodules in the thickened pleura were found to contain numerous bacilli, indistinguishable in form and character from those described by Koch, but similar investigation of the pulmonary and other tissues of the body failed to discover a trace of them elsewhere. If it be admitted that the bacilli in such a case as this form the determining cause of the disease, it only remains to be decided how the bacilli obtained access to the affected part. One theory propagated by Baumgärtner suggests the possibility that a real physical inheritance of the virus has taken place, and that the poison lies dormant in the body until favourable conditions for its development present themselves. Another view, perhaps more easy of acceptance, regards the general circulation as the natural channel for the distribution of the bacilli and the white corpuscles as the bearers of them. An apparently primary tuberculous affection such as this case exemplifies is occasionally to be noted in the long bones, in which also the presence of bacilli has been more easily demonstrated than explained. (*Wiener medizinische Wochenschrift*, No. 51, 1884; *Med. Times.*)

Errors in the Diagnosis of Pregnancy.—Professor Pajot, in a clinical lecture, observed that he wished to refer to a case which would prove of great value to the pupils, as putting them on their guard in relation to faults in the diagnosis of pregnancy. Such faults have been committed by men of the highest eminence, for if in 95 cases out of the 100 diagnosis is quite easy, in some others it is attended with extraordinary difficulty. In this case, of recent occurrence, such a fault had been committed by men in a high position, one of them enjoying great celebrity. In place of hesitating to communicate the case Professor Pajot brings it prominently forward, as it exhibits the precise rule which should be observed on these difficult occasions, and may save the reputation of the practitioner and even the life of the patient. A lady, thirty-five years of age, had a child when she was twenty, after a laborious labour requiring the forceps, and followed by a vesico-vaginal fistula. Since then she had two labours, both quite easy. After the last of these, eight years ago, she suffered greatly from menorrhagia; but having five years since begun to introduce a large sponge into the vagina, for the purpose of sustaining the uterus, which had descended considerably, and absorbing the urine from the vesico-vaginal fistula, the menorrhagia ceased and was succeeded by irregular and sparing menstruation. Having become a widow she re-married, and coition was always performed with the sponge at the bottom of the vagina. Last summer she consulted Professor Pajot because her abdomen had greatly enlarged and she wished to know whether she was pregnant. Having removed the sponge, he proceeded to examine her, and found the perineum very lax and easily depressed, a small vesico-vaginal fistula still existing. The cervix, in the erect posture, descended to within a few centimetres of the vulva, and was flattened, small, hard, atrophied and colourless. The orifice was but slightly developed. The uterus rose largely out of the pelvis and was very mobile, but its oscillations were not communicated to the cervix. Professor Pajot delayed giving his opinion on the case for a fortnight, when the patient declared that she felt the child move; but the fœtal heart could not be heard and the opinion was still withheld. Meanwhile an accoucheur and hospital surgeon was consulted, who, after an attentive examination, declared that an ovarian cyst existed. This alarming the patient, a celebrated laparotomist was consulted, who stated that a large fibrous tumour of the uterus existed and advised an operation. Three weeks after this last consultation, the patient, having taken some very violent purgatives, gave birth to a child between seven and eight months old, all traces of the tumour disappearing. "Faults like these are committed only because old counsels which I have long since delivered have been forgotten. In these difficult and obscure cases, I said there is a simple line of conduct to be followed, which is both useful and prudent, and never compromises the health or life of the patient, nor the reputation of the practitioner. This is *expectation;* we must know how to wait. If there is some pressing indication, of course we must fulfil it; for, when life is menaced, what matter is it about the pregnancy? But, as a general rule, neither the health nor the life of the patient is in question. The woman desires to know whether she is or is not pregnant. And as long as the problem does not appear to be soluble with certainty we should make no resolutions. Let us wait, and above all things wait without acting, if nothing creates an absolute necessity for action. Time is the best of all our means of diagnosis." (*Presse Méd. Belge,* Sep. 7, 1884; *Med. Times.*)

Extracts from British and Foreign Journals.

Exsection of the Fascia in Dupuytren's Contraction.—Dr. R. Gersuny describes a new operative measure used by him in the treatment of contraction of the palmar facia. He makes a longitudinal incision of the integument over the prominent aponeurotic bands, and then, through the opening caused by the retraction of the skin, excises this part of the palmar fascia. The wound is then easily closed by a few sutures and dressed antiseptically. The advantages of this method, he claims, are that there are no thickened and knotty cords left in the aponeurosis, and further, that owing to the direction of the line of incision in the skin there is but little retraction of the tissues, and the wound heals readily. (*Wiener medizinische Wochenschrift*, August 9, 1884.)

Portable Antiseptics.—Dr. T. E. Hayward of Haydock writes: Professor Lister has recently recommended, as a portable antiseptic, a saturated solution of corrosive sublimate in glycerine; a fluid drachm of this solution being sufficient to convert about four pints of water into one in a hundred solution. The glycerine solution, doubtless, occupies a comparatively small bulk, and is readily mixed with water; but it is not very convenient to manipulate in measuring small quantities, and, if the bottle containing it should be broken, or become uncorked while being carried with other things, the result is unpleasant. A much more handy way of carrying the corrosive sublimate is to prepare powders, each containing ten grains of the salt and chloride of ammonium. One of these mixtures will dissolve in a little water in a few seconds; and, on diluting up to a pint, a solution is obtained of the strength of one in nine hundred and sixty. A few of these powders, wrapped around with gutta-percha tissue to avoid deliquescence, can readily be carried in the pocket-case. The well-known fact that ammonium chloride aids the solution of corrosive sublimate in water, renders the above suggestion so obvious that it has, doubtless, occurred to many; and it has probably already appeared in print. In view, however, of the very great advantage to all surgeons in country practice of having so ready a means of preparing an antiseptic solution, it may be pardoned if attention is drawn to the matter. (*British Med. Journ.* Oct. 18, 1884.)

Uræmic Amaurosis.—Dr. Friedenwald, Professor of Diseases of the Eye, Baltimore, terminates a paper read at the Baltimore Medical Association (*Philadelphia Medical News*, August 9) with the following conclusions:—(1) When amaurosis suddenly overwhelms a patient in both eyes, with no ophthalmoscopic change, uræmia should be suspected, even in the absence of all other prominent uræmic symptoms. (2) It will continue only as long as the uræmia exists, and will disappear when the function of the kidney is re-established. When permanent injury to sight is observed, it may be due to pre-existing retinal change, not at all uncommon in Bright's disease. (3) The chances of a full return of sight are somewhat impaired when the patient has been the subject of recurring attacks. (4) By exhibiting jaborandi and other means of inducing free diaphoresis, and by free purgation, a catastrophe may be averted in the general forms of uræmia; but when it occurs in pregnancy, premature labour is the only remedy which promises safety to the patient. (*Med. Times*, Nov. 1, 1884.)

The Elimination of Mercury.—Dr. Schuster has shown tnat mercury can be detected in the fæces and in the urine long after its administration has been discontinued. He fixes the limit of this period at about six months. Applying the knowledge of this fact to the elucidation of some clinical facts he remarks that "it is surely not accidental that frequently, in from four to six months after mercurial treatment, the banished syphilitic symptoms reappear or show themselves more decidedly, both in the early and in the late manifestations of syphilis. After the elimination of mercury has continued for four months, there is too little mercury left in the system to retard the renewed increase of the syphilis in such relapsing cases. It is advisable, therefore, in view of the eliminative period of the incorporated mercury, to repeat the mercurial treatment of syphilis in from four to eight months after the course which has suppressed the syphilitic manifestations, according to the earlier or later expectation of fresh symptoms." (*Journal of Cutaneous and Venereal Diseases*, vol. ii. No. 9.)

The Treatment of Tinea Tonsurans by Croton Oil.—Apropos of an energetic attack directed against the physicians of the Hôpital St. Louis by Dr. Ladriet, of Lacharrière, Dr. Besnier has again pointed out the injurious character of the treatment of tinea by croton oil. This treatment has long been recommended in France by Dr. Ladriet, who fabricates for this purpose his well-known pencils of croton oil, to be rubbed over the affected parts. They produce an intense, often a suppurative, inflammation of the hair follicles, as a result of which, according to the author, a cure is almost constantly affected. This procedure was formerly experimented with at the Hôpital St. Louis and after numerous trials it was rejected as inefficacious, and dangerous—dangerous because the suppuration of the hair follicle may determine an incurable alopecia, an unfortunate result which tinea tonsurans left to itself never produces. It is, moreover, inefficacious, since recurrences of the disease were observed in patients treated and discharged as cured by Dr. Ladriet himself. (*Journal of Cutaneous and Venereal Diseases*, vol. ii. No. 7.)

Researches on the Nature of Lupus.—Messrs. Cornil and Leloir practised intra-peritoneal inoculations with fragments of tubercular lupus tissue on fourteen guinea-pigs. In nine cases the results were negative, the animals being killed or having died in periods varying from twenty-six to 398 days. In five other cases tubercular lesions were found in the peritoneum, lungs, and other viscera. The period of incubation was longer than is usually the case. In two of the cases portions of the lupus tissue used were examined for tubercle-bacilli, but no bacilli were found.

Inoculation with fragments of tubercular tissue was made on the anterior chamber of the eye of a rabbit four times, in three out of the four with negative results. In the case in which the inoculation succeeded, typical tuberculosis of the eyeball followed.

Messrs. Cornil and Leloir were not successful in finding tubercle-bacilli in lupus tissue; in twelve fragments of lupus tissue examined, each fragment supplying twelve sections, only one solitary tubercle-bacillus was found. Tissue, a fragment of which had produced in two guinea-pigs inoculable tubercle, did not contain one tubercle-bacillus in twenty sections.

The authors compare these negative results with the inconstancy of the success of the inoculation experiments, and remark that a period relatively long elapses between the appearance of tubercles and the date of inoculation in the cases in which the results are positive, contrary to what is the case in true tuberculosis. (*Arch. de Physiol.*, 1884, vol. i. p. 325; *Annales de Dermatologie et de Syphiligraphie*, vol. v. No. 8.)

Treatment of Acute Nephritis.—Aufrecht strongly advises abstinence from the use of all stimulating diaphoretics, or diuretics which irritate the tissues, in treating acute parenchymatous nephritis. He lays much stress on the advisability of keeping the patient in bed until the albumen disappears from the urine, and of giving as little nitrogenous food as possible, so that the kidneys may have little to excrete. At the same time he gives large quantities of liquids. For the first ten days or so he gives water, effervescing water, gruel, bread and butter, and farinaceous food. He begins to give milk or beef tea only at the end of the second week. (*Berlin. klin. Wochenschr*, 51, 1883.)

Peptonuria.—R. v. Jaksch found peptonuria in seventy-six out of 354 patients. In seventy-two cases out of the seventy-six it was associated with inflammatory processes or purulent accumulation in some part of the body. It appears most commonly and with the greatest intensity when absorption of effusions is occurring, as from the joints in rheumatism or from the pleura. It may give indications regarding the occurrence or arrest of absorption of exudation. (*Zeitschr. f. klin. Med.* vi. p. 413.)

Physiological Albuminuria.—A. de la Celle de Chateaubourg finds that physiological albuminuria is exceedingly common. It occurred in 592 out of 701 cases examined—*i.e.*, 84 per cent. It is greatly increased by violent muscular or mental exercise, such as long marches or preparing for examinations. It is also increased by baths. In children from six to fourteen years of age, it occurred in 78 per cent., but generally to a smaller extent than in adults. (*Recherches sur l'Albuminurie physiologique*, Paris 1883; *Cent. f. med. Wiss.* p. 282, 1883.)

Mechanical Arrest of Bleeding from the Stomach or Œsophagus.—Schilling recommends a modification of Schreiber's apparatus. A thin caoutchouc bag is to be fastened to the end of an elastic tube and passed into the stomach, and blown up until the mechanical pressure it exerts within the walls of the stomach stops the bleeding. The exit of air from the tube may be prevented and the bag kept distended, by furnishing the outer end of the tube with a stop-cock. When bleeding takes place from the œsophagus a caoutchouc condom may be employed instead of a bag. (*Aerztl. Intelligenzblatt*, 2, 1884; *Cent. f. med. Wiss.* 15, 1884.)

Vapour of Glycerine for Cough.—According to an account in the *Gazette Médicale de Nantes*, M. Trastour has employed with great advantage the vapour of glycerine whenever a distressing or frequent cough has had to be alleviated. The remedy is very simple in application. About fifty to sixty grammes of glycerine are heated in a porcelain capsule by means of a spirit-lamp; a large volume of vapour is thereby disengaged, and should be breathed by the sufferer. Glycerine, in which carbolic acid has been dissolved, may also be employed. The cough of phthisis and the irritation in the throat of many complaints afford proper trials for these remedies. (*Lancet*, December 6, 1884.)

Injections of Ether and Iodoform in Cold Abscess.—Professor Verneuil obtains a rapid cure in almost all his cases of cold abscess, abscess from diseased bone or from congestion, &c., by ethereal injections of iodoform of the strength of one in twenty. The abscess is first emptied by means of Potain's aspirator, and then receives from 100 to 300 grammes of the iodoform solution. By not exceeding this quantity (*i.e.*, five to fifteen grammes of iodoform) no fear of accidents need be felt. The liquid penetrates into all the anfractuosities and diverticula of the abscess, the ether becoming absorbed or evaporated, and the antiseptic agent being deposited uniformly on the pyogenic membrane, the action of which it modifies. This simple means, so exempt from danger and so easy of application, has proved highly successful, very large abscesses having yielded to three or four injections. (*Revue de Thérapeutique*, August 15, 1884.)

Bicarbonate of Sodium in Iodoform Poisoning.—Dr. Behring states that bicarbonate of sodium is an antidote in poisoning from iodoform. Since the latter drug is eliminated in the urine as a sodic salt, the author assumes that it abstracts alkalies from the blood. By supplying the alkali thus withdrawn from the blood he believes that the system may acquire a special toleration for iodoform. (*Rivista Clinica*, No. 8, 1884.)

Bacilli in Syphilis.—The discovery of bacilli in syphilitic lesions is announced by Dr. Lustgarten (*Wien. med. Wochensch.* No. 47, 1884.) His researches, which were made in Weigert's laboratory at Leipsic, consisted in a special method of preparation and staining of sections of primary chancres and a gumma. In all were found, isolated or in small groups, slender, straight or slightly curved bacilli, much resembling tubercle-bacilli. The organisms were embedded within swollen lymphoid cells, and exhibited transparent spots, which resembled the "spores" of Koch's tubercle-bacillus. (*Lancet*, December 6, 1884.)

Dosage of Potassium Iodide.—Dr. Seguin, in recommending the American practice of giving large doses of potassium iodide in syphilis, adds the following hints as to the mode of administration :—"First the iodide should be administered largely diluted in simple water, in a feebly alkaline water, or in milk (Keyes.) This statement would, I think, be acquiesced in by all experienced practitioners, and is in harmony with the teaching and practice of many authorities. It is interesting to recall that Williams, Wallace, and Elliotson usually gave the iodide simply dissolved in mint water or in camphor mixture. Second, the time of administration. On this point a singular unanimity prevails: give the drug 'after meals,' or 'on a full stomach,' say all the authorities. Yet not one of them gives a reason for this direction, not even those whose ostensible object is to teach therapeutics. And, indeed, no good physiological reason could be given for this rule, which I strongly suspect is nothing more than blind following after example. In days when the physiology of digestion was practically unknown, when experimental therapeutics was not begun, the eminent physicians who were the first to use the iodide for syphilis (Williams, Clendinning, and Wallace) said "Give it after meals," and so it has continued. Now, I have strenuous ly contended against the giving of decomposable medicines, more especially the iodides and bromides, on a full stomach which contains a highly acid semi-fluid mass. It is almost a certainty, theoretically considered, that these salts are more or less split up by the hydrochloric and lactic acids of the stomach, and pure iodine or bromine set free. The inactive stomach, on the contrary, is, we know, in just the condition to facilitate the simple absorption of saline solutions without chemical change. It is empty, and either neutral or feebly alkaline in reaction. It is capable of rapidly absorbing a large amount of simple water, and probably can do the same thing with an alkaline solution of iodide or bromide. Perhaps, also, a quantity of the solution passes into the upper part of the small intestines and is there absorbed. Again, as to the results of experience. I find that by giving iodides in this way iodism is very rare and gastro-intestinal irritation almost unknown. Patients, who had been previously iodised by one or two grammes per diem, given in the usual way, I found could take from twenty grammes to thirty grammes with impunity. Furthermore, in at least two of my patients, digestion improved while using the larger doses of iodide of potassium diluted with Vichy water (probably because of thorough washing out of the stomach). I repeat, the iodide of potassium should always be given upon an empty stomach, say about half an hour before meals. In the next place, about the dosage for children. Influenced no doubt by the extraordinary susceptibility of little children to opiates, many practitioners give them altogether too small doses of many remedies. This is notoriously true of the bromides, and I am sure is also true of the iodide of potassium. For threatening conditions of cerebral disease, meningitis, syphilis, &c., if we decide to give KI we should administer it almost in adult doses. In cases of basal meningitis with neuro-retinitis and in some other cases, I have given from four grammes (sixty grains) to eight grammes (120 grains) three times a day to patients between four and eight years old, not only with good result as regards the cerebral symptoms, but also without iodism or gastro-intestinal irritation." (*Archives of Medicine*, October, 1884.)

Plovers' Eggs.—Every one has remarked the difference between the white in plovers' eggs and in hens' eggs. Tarchnoff has investigated this difference. He finds that in all birds which are hatched fledged, the albumen in the egg is much thinner and more watery when fresh, and more transparent when boiled, than in hens' eggs. The eggs in birds which are hatched unfledged resemble those of the hen. Pigeons' eggs are intermediate between the two kinds. To this transparent albumen the author gives the name of "*tata*" albumen. It contains about 2 per cent. more of water than ordinary albumen and requires a higher temperature to coagulate it. The point about it which is important in practice, however, is that when coagulated it is digested and peptonised eight or ten times more readily than ordinary white of egg. In cases where the digestion is very feeble and where it is important to sustain the strength of the patient, it is possible that by using plovers' eggs instead of hens' eggs considerable advantage may be gained. (*Pflüger's Archiv*, vol. xxxiii.)

Action of Pomegranate Root.—Kamnitzer from experiments upon animals finds that sulphate of pelletierine causes restlessness, trembling, and rapid respiration only, whereas decoction of the pomegranate bark has a caustic action on the mucous membrane of the stomach and intestines, and produces convulsions and death. He considers that the pain in the stomach and intestines and the anthelmintic action of the bark are due to the tannin it contains and not to the pelletierine. (*Inaug. Diss.* Berlin, 1883; *Centralblatt f. med. Wiss.* 93, 1884.)

Notes and Queries.

Harvey's Manuscript Lectures.—We have received the following from Dr. E. H. Sieveking, 17 Manchester Square, W.:

"The MS. of the original lectures at the Royal College of Physicians by William Harvey, including his earliest observations on the heart and circulation, and delivered by him in and after 1616, were rediscovered in the British Museum in 1877. I gave a description of the little book, and exhibited an autotype copy of one page, in my Harveian oration at the College in 1877. I then suggested that it would redound to the honour of the present generation, and be an advantage to the history of medicine, if the entire lectures could be published in autotype, accompanied by an intelligible transcript. The handwriting is so crabbed, and there are so many abbreviations, that no one but an expert could succeed in understanding them. Without the valuable aid of Mr. Bond, now the principal librarian of the British Museum, I should have failed in my attempts to understand much, if anything, of the lectures. By dint of severe labour, Mr. Bond succeeded in interpreting one of the lectures, and has now been good enough to make me acquainted with a gentleman, a member of his staff, who will undertake to transcribe the whole of the lectures.

"My inquiries lead me to believe that no publisher could be found to undertake the risk of publication in the form proposed, unless guaranteed a certain amount of professional support. On the other hand, I calculate that if from two to three hundred gentlemen would engage each to take a copy at a price not exceeding two guineas, the work might be safely proceeded with.

"Autotyping is a much more expensive process than ordinary printing, and the honorarium of the transcriber would necessarily add considerably to the cost.

"May I ask your permission to submit the inquiry to your readers, whether they will aid in this labour of love of, and admiration for, our great prototype of the scientific physician.

"I am permitted to state that the Presidents of the Royal

Colleges of Physicians and Surgeons warmly support the undertaking.

"Any communication on the subject may be addressed to me direct, or to Messrs. Churchill, 11 New Burlington Street, W."

WYETH'S COMPRESSED TABLETS.—Messrs. Burroughs and Wellcome, of Snow Hill, E.C., have sent us a neat case containing specimens, among others, of their compressed tablets of potassium chlorate, potassium chlorate with borax, sodium salicylate, quinia bisulphate, ammonium chloride, "soda-mint," and potassium permanganate (one grain). These preparations are made into elegant and firmly coherent pellets by mechanical pressure alone, and in the case of some of the drugs the absence of any excipient gives this form an advantage over that of pills or liquid mixtures. The tablets of potassium chlorate we have repeatedly found very useful in slight affections of the throat; the "soda-mint" tablets, containing four grains of sodium bicarbonate, a quarter grain of ammonium carbonate, and a small quantity of oil of peppermint, are a pleasant palliative of the sub-acute misery of "heart-burn;" and the ammonium chloride tablets have in several cases been of great service in the night dyspnœa of emphysematous bronchitis. The potassium permanganate tablets seem at first sight likely to solve the difficulty some have felt in finding a suitable pill-excipient for this unstable salt, but the taste of the naked drug and the risk of its producing ulceration in mucous membranes with which it is brought into direct contact make us hesitate to recommend their indiscriminate use.

LEBON'S CLINICAL OUTLINES.—Messrs. Lebon (23 Southampton Buildings, Chancery Lane, W.C.) have issued a further set of their admirable diagrammatic outlines for recording the results of clinical and post-mortem examinations in precise and graphic form. One set displays the cutaneous surface of the body with its nerve-supply, another the head and face on a larger scale, others the larynx, pelvic region, spine, &c., and lastly there is a capital set of sections of the brain for internal lesions. We recommend this new issue as heartily as the former. [*Pract*, xxxii. 383.]

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Practical Manual of Diseases of Women and Uterine Therapeutics. By H. Macnaughton Jones, M.D., etc. Second edition, revised. Cr. 8vo, pp. 472, illustrated. London: Baillière, Tindall, and Cox. 1885.

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Contributions to the Topographical and Sectional Anatomy of the Female Pelvis. By D. Berry Hart, M.D., F.R.C.P.E., etc. Large 4to, 12 plates with explanatory text. Edinburgh and London: W. and A. K. Johnston. 1885.

A Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools, being a series of resolutions passed by the Medical Officers of Schools Association, January 7, 1885. Small 8vo. 1*s.* London: Churchill. 1885.

⁂ Any of the foreign works may be procured on application to Messrs. **Dulau**, of Soho Square, W.C.; **Williams** and **Norgate**, of Henrietta Street, Covent Garden, W.C.; or **Baillière**, of King William Street, Charing Cross.

Department of Public Health.

THE RESULTS OF THE NOTIFICATION OF INFECTIOUS DISEASES.

(*Continued from* p. 157.)

Halifax (Yorkshire).—Population 73,630 in 1881. Compulsory powers adopted in 1882. Notification required from the occupier, whether any medical man is in attendance or not, and also from the medical practitioner. The diseases to be notified are those specified in the Report quoted in vol. xxxiii., page 470.

From the Annual Report for 1881, the year which preceded the adoption of compulsory powers as to the notification of infectious diseases, some statistical and other information bearing on the subject under discussion may be obtained. The general death-rate for that year was 21·4 per thousand, and the mean rate for the previous ten years was 25·5 per thousand. The deaths during 1881 included 6 from small-pox, 21 "fever," 4 diphtheria and 102 scarlet-fever; and as regards scarlet-fever it appears from a report which was in 1881 submitted by Dr. Ballard to the Local Government Board with reference to a prevalence of that disease in the borough, that the fatal cases of scarlet-fever during the previous six years had been as follows:—1875, 66; 1876, 17; 1877, 160; 1878, 58; 1879, 125; 1880, 44. Still referring to the same prevalence Dr. Ballard says that the measures specially calculated to arrest the spread of the disease, "namely, isolation and disinfection of infected houses, rooms, and things, were hardly at all adopted." There was, however, some hospital provision for the urban district, for, owing to small-pox some ten years previously, a gentleman's mansion was suddenly converted into a hospital, and the Medical Officer of Health, in reporting for the year 1881, states that 69 cases had been admitted. These cases included 34 scarlet-fever, 17 typhoid, and 16 small-pox; but ten of them came from the neighbouring rural sanitary district.

The Report for 1882 refers to the completion of a new small-pox hospital: it records the general death-rate from all causes as having been 20·3 per thousand, and it gives the following details as to deaths from certain specified infectious fevers during the three years 1880—82:—

Date	1880	1881	1882
Small-pox	—	6	—
Scarlet-fever . . .	44	102	21
Diphtheria . . .	4	4	2
"Fever"	19	21	23

The Report then proceeds as follows:—

> "In August last 'the Halifax Corporation Act 1882' became law, and *inter alia* contained the clauses for the compulsory notification of infectious diseases. As soon as possible the necessary forms to be used by the medical profession were got out, and now at the end of the year, I am bound and pleased to say that in the four months' working of the Act, not a single hitch has occurred of any moment. Thus, most of the objections and difficulties raised beforehand prove to be imaginary, in the presence of a generous application of the Act. On receipt of a certificate of infectious disease at the sanitary office, either the inspector or sub-inspector makes an early visit to the place, inspects, and, if possible, finds out the cause. If the patient is not to be removed to the hospital, then the inspector looks after the general surroundings—sinks, drains, ash-pits, &c.—and distributes bills with instructions, disinfectants &c., but in no way or sense whatever interferes with the treatment or advice of the medical practitioner in charge. The sanitary officers are thus early co-workers with the doctor, each in his own sphere, for the good of the patient and the health of the town."

The cases which had been notified in the four months referred to were:—small-pox 1, "fever" 49, scarlet-fever 103, and diphtheria 1. The number of houses which had been inspected during the year was 5,020, as against 2,882 in the previous year; whereas the houses disinfected numbered only 171, a decrease of 109 on the number for 1881 when scarlet-fever was so prevalent. The method of disinfection in use is spoken of as very uncertain in its operation, a disinfecting oven being "much needed."

So far, our application for a copy of the Annual Report for 1883 has not been successful.

Hartlepool (Durham).—Population 12,361 in 1881. Compulsory powers only adopted in 1883. Notification to be made both by the occupier, whether a medical practitioner is in attendance or not, and also by the medical practitioner. The diseases to be notified are those specified in the Report of the Select Committee of the House of Commons.[1]

Heywood (Lancashire).—Population 22,979 in 1881. Compulsory powers only adopted in 1883. The diseases to be notified and the persons of whom notification is required are the same as in the case of Hartlepool.

Huddersfield (Yorkshire).—Population 81,841 in 1881. The compulsory notification of infectious diseases was first adopted in Huddersfield in 1876, but owing to the unsatisfactory nature of the provisions relating to this subject, which only required notification in the case of a person who was "without proper lodging and accommodation, enabling the case to be properly isolated so as to prevent the spread of the disease or the proper treatment thereof," the results fell far short of those which had been anticipated. Thus, in 1879 information was given under this clause in 244 cases, 175 of whom were removed to hospital. But by various means 174 cases of infectious diseases were heard of, concerning which no information had been given, and owing partly to the late period at which the information was acquired only three of them were removed to hospital.[2] In 1880 a fresh Act was obtained which required notification from the occupier and from any medical practitioner attending a case of infectious disease, both persons to supply the information as soon as they became aware of the existence of the disease; and it will suffice for our present purposes to enquire into the working of this later Act. The diseases to be notified are, according to Section 63 of the Act, cholera, small-pox, scarlet, puerperal, typhus, and typhoid fevers; but under Section 65 it is enacted that "the Corporation may from time to time, by resolution on the report of the Medical Officer of Health, order that measles, German measles, erysipelas, whooping-cough, or splenic fever, and, with the sanction of the Local Government Board, any infectious or contagious disease other than those specifically mentioned in this Act, shall be deemed to be an infectious disease within and subject to the provisions of this Act." According to the official return made to the Local Government Board, diphtheria, relapsing fever, and erysipelas are notified in addition to the diseases referred to in Section 63 of the Act.

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[1] *See* vol. xxxiii. p. 470.

[2] See "Report on the Use and Influence of Hospitals for Infectious Diseases," in *Supplement to the Tenth Annual Report of the Local Government Board*, 1882 [c.—3290], p. 134.

On the issue of the Annual Report for 1880, Dr. Spottiswoode Cameron refers to a considerable extension of the Birkby Hospital which had been provided by the Corporation for the isolation of cases of infectious diseases, and he explained that during the year there had been 131 cases admitted, namely:—small-pox 5, enteric fever 62, German measles 5, erysipelas 1, febricula 1, and scarlatina 56. He also says:—

> "The compulsory notification of infectious diseases has undergone a complete change in the course of the year. The clause in the former Act which required notice only in cases where there was no proper accommodation gave us useful information, but in some cases the medical man in charge of the patient regarded the case in a more hopeful light than your medical officer. In one case, in a small house containing three bedrooms, all however opening together, there was a family of nine. One child showed signs of scarlet fever on the 29th of February, another on the 8th and another on the 22nd of March. They had no nurse. The mother attended to the healthy as well as the sick, and washed out the cans for her husband, who sold milk in the town. On the occasion of my visit the cans were actually in the kitchen, and we thought it necessary to take proceedings in this case against the medical man in attendance for not sending notice; but the singular thing was that his defence, instead of being, as one would have expected, that he had forgotten, was that there was ample accommodation for isolating the patients. Our new Act gets rid of this difficulty by requiring notice of every case of certain diseases, and since the new forms were sent out in November the medical men in the town have, with scarcely an exception, responded well to your appeal to them to deal loyally in the matter. Some of them have expressed great satisfaction at the change, as it relieves them of an invidious responsibility."

The Annual Report for 1881 gives the first account of the proceedings for a completed year under the new Act. The general death-rate for 1881 was 20·35 per 1000, that from the seven principal zymotic diseases was 1·26; the deaths among the latter including 7 measles, 17 scarlet-fever, 3 diphtheria, and 11 "fever." The cases notified were 297 in number, and a considerable number were isolated in the Birkby Hospital. Thus:—

	Cases notified.	Removed to hospital.
Small-pox	4	4
Scarlet-fever	197	119
Fever	68	41
Ditto (doubtful)	5	2
Diphtheria	4	2
Puerperal fever	1	1
Other diseases	18	4
	297	173

With regard to isolation it should be noted that the Corporation of Huddersfield have under their Improvement Act 1880, powers very considerably in excess of those granted under the Public Health Act 1875, with reference to infectious diseases. Thus they may close schools, shops, dairies, &c.; they may declare any house or part of a house to be an infected place, and they may prevent the access of the public to such places, and order works of disinfection, &c., to be carried out. These powers necessarily give them exceptional facilities in securing the isolation of those who—in the opinion of the Officer of Health—constitute a danger to the public health so long as they remain at home.

Dealing specially with the subject of the compulsory notification of infectious diseases, Dr. Cameron writes:—

> "The clause in our last Local Act, superseding that of the Act of 1876, has been a great improvement. The public are coming to look upon the reporting of infectious disease as the natural order of things, and, though there have been a few instances where notice has not been sent us, these have been the exception instead of the rule. Medical men tell me they find less difficulty about reporting cases when the responsibility of deciding whether the isolation is sufficient is shifted from their shoulders to those of your Medical Officer. Householders make fewer objections to the reporting of such cases when they see that the law applies to rich and poor alike, and that the reporting does not of itself necessitate the removal of the patient. . . The present Act requires the notice to be given whatever the accommodation. You will remember that in the clause, as submitted to Parliament, the medical man was still only required to give his certificate to the occupier, but in Committee the clause was altered (by Lord Redesdale, I believe,) so as to make the medical man directly responsible for sending his certificate to you. Although at first sight the alteration made by Parliament in the clause seemed scarcely fair to the medical profession, in practice it has acted on the whole very smoothly, and certificates are generally received by us sooner than formerly. Most of the medical men in the town fill up the optional questions at the foot of the certificate; a few fill them up partly or occasionally; three or four do not fill them up at all. The object of these questions is, firstly, to afford medical men an opportunity, if they wish it, to certify on behalf of their patients that a proper and thorough system of isolation is being carried out; and secondly, to direct our attention to cases most in need of it. I have personally visited the patient where the medical man has not been able to guarantee complete isolation, and have taken such precautionary measures as seemed necessary. I have also visited some of the cases in which the information was incomplete. It has happened occasionally that the patient's friends have represented to their own medical man that the isolation was more effectual than it has been found to be upon my visit. In such cases I have had to insist upon his instructions being more thoroughly carried out, and even, in some instances, where that could not be done, to remove the patient. I have uniformly received every assistance from my medical brethren in carrying out your instructions, and I should like to record here my sense of the courtesy, kindness and consideration they have always extended to me.

"Means have been taken to inform the public by posters and handbills that they are themselves bound to report cases of infectious disease occurring in their houses, and fines have been inflicted for non-compliance with this regulation. No system of notification of disease will ensure our hearing of every case, but most of thos of which notice has not been sent have, more especially latterly, been where there has been some difficulty in ascertaining the existence of the disease. . .

"Several cases of modified small-pox were reported, and all removed to hospital. The early notification and isolation of these is probably the reason that we have escaped so far from a visitation of this disease.

"The introduction of this new clause differing so materially from the 67th Clause of the Act of 1876, calls perhaps for a review of the results of the former Act." . .

Then follows a table showing the operation of the 1876 Act in securing notification.

"On examining this table it will be observed that during the first year, October, 1877 to September 1878, for every ten deaths [from small-pox, scarlatina and typhoid fever] registered in the borough twenty cases had been reported; that during the second year, for every ten deaths in the borough twenty-three cases had been reported; and that for the third year twenty-eight cases were reported for every ten deaths, showing a steady increase in the proportions of cases reported.

. . . "Coming now to the year 1881, during the whole of which our newer notification clause has been in operation, we find at once an increase of certificates and a diminution of deaths. The admissions to hospital are also more numerous in proportion to the mortality; for, having notice in every case, and having the advantage of thirty additional beds, we have been able to take cases into hospital that would have been left at home before. With all our accommodation, we have had, however, during the latter part of the year, for lack of space, to leave some cases of scarlet-fever at home, which it would have been advisable to take into hospital.

. . . "We have already seen that the death-rate from the seven zymotic diseases this year is less than half the average of that of the seven previous years. It would not be right to attribute any but a small proportion of this improvement to the new Act. But as such Acts are upon their trial, it may, perhaps, be worth while to compare our death-rates from the diseases we specially attempt to treat in our hospital since the Act came into force with those before. From small-pox, during the eight years from 1869 to 1876, our average death-rate was 116 per million (0·139 per 1000). During the five years from 1877 to 1881, our death-rate has been 5 per million (0·005 per 1000). From scarlet-fever, which we have always amongst us, our rate of mortality for the eight years before our Act came into operation was 925 per million (0·93 per 1000). During the five years that our Act has been in operation it has been 599 per million (0·60 per 1000). From 'fever,' chiefly typhoid, during the eight years before our Act, our annual mortality averaged 640 per million (0·64 per 1000); during the five years past it has been 371 per million (0·37 per 1,000). Our deaths from diarrhœa were 859 per million the eight years before the Act came into force, and have been 541 per million during the five years since. We have never asked for notification of cases of diarrhœa, but the intimate relations between zymotic diarrhœa and typhoid would lead one to expect that any measures taken to check the spread of the latter would have more or less influence in lessening the former. . . . . .

"The death-rate from causes of all kinds, for the eight years before the Act, was 22·86 per 1000 (22,861 per million), for the five years since 22·00 per 1000 (21,999 per million); an improvement at the rate of nearly 4 per cent., and quite out of proportion to the 35 per cent. improvement in the scarlatina, and the 42 per cent. improvement in the 'fever' returns. . . . . .

. . "General sanitary measures have been chiefly the cause of this improvement, but yet the fact remains, and is worthy of note, that the death-rate from scarlet-fever and 'fever' combined has diminished 38 per cent.; while that from measles and whooping cough [two diseases not required to be notified or isolated] combined has increased 9 per cent."

According to the Annual Report for 1882 the general death-rate was 22·4 per 1000, and that from the seven principal zymotic diseases 2·63 per 1000. Not much is said as to the compulsory notification beyond a statement that "the compulsory registration clause has worked smoothly during the year." A table shows that 300 cases of sickness were notified, and that a considerable proportion of them were admitted into the infectious hospital. Thus:—

	Cases notified.	Removed to hospital.
Small-pox	—	—
Scarlet-fever	184	119
Typhoid fever	78	45
"Fever"	1	1
Diphtheria	7	...
Puerperal fever	2	...
Other diseases	28	6
	300	171

The Report for 1883 records a general death-rate of 21·38 per 1000, and a mortality from the seven principal zymotic diseases of 1·68 per 1000. With reference to the infectious diseases which are notified, and those which are not notified, to the sanitary authority, Dr. Cameron makes the following remarks concerning measles and German measles:—

"There was a marked increase in the number of cases reported as infectious under our Local Act during part of this half year. The two earlier fortnights had a considerable, the third a slight, excess of such new cases on the average of the whole year; the two fortnights which followed were much below that average. The average of the next six weeks was above that of the whole year In the last fortnight of October eleven cases were reported, the average for the whole year having been 5·7 per fortnight. In the two fortnights of November seven and thirteen cases were reported, and three and thirteen in the two fortnights of December. The deaths from the seven zymotic diseases were highest in the last fortnight of October and the first fortnight of November, and chiefly from measles and whooping-cough, diseases not reported at present under our Local Act. . .

"Measles, as I have just said, is not necessarily reported to us. A few cases were however notified on the special certificate forms used under the Act, and cases were heard of through the Infirmary and Poor Law officials. At the beginning of the year the town was nearly free from the disease. Fatal cases occurred, one in Lindley in the first week, and one in Almondbury in the fourth week of the year, and we had no further fatal case till the second week in May, and only one other between that and August. In my quarterly report read at your meeting on the 11th of April I made the following suggestions :—

"'In the matter of zymotic diseases I would suggest to you the advisability of choosing a time like the present to add measles and German measles to the list of diseases included under our Local Act as "infectious." You have the power to do this, and I recommend it on the following grounds. Measles is a disease very difficult to check if it once gets a fair start, and it is a disease about which a very great amount of culpable negligence in the matter of disinfection exists. The fact that eighty deaths last year [1882] were due to this one disease sufficiently shows how very fatal it may be. I do not propose that you should depart from your usual practice of declining, except in very special circumstances, to take cases of this disease into hospital ; the children usually affected are too young for this, but there are many means we might adopt at their own homes, such as separating the sick from the healthy, the careful disinfection of the house and the patient's clothing, the preventing of other members of the family from attending schools and the like, which might, I think, help to keep this disease within more reasonable limits. When an epidemic occurs we are almost powerless to cope with it, but if we had information of the cases as they arose, much might be done to prevent the disease from ever assuming an epidemic form. You are doubtless all aware of the prevalent opinion amongst medical men that an epidemic gathers virulence as it extends. Our own epidemic of measles last year was an instance of this ; it began mildly, and as the number of cases increased the proportion of fatal cases amongst them also increased. If therefore we can keep the disease from becoming epidemic may we not hope by that means to keep it also less virulent ? The expense of the change will be very little. Most cases are not attended by a medical man, and the householder will himself be bound to report, so that there will not even be the small fee for the certificate.'

"You did not, however, seem disposed to take the step suggested, and the opportunity of doing so when the disease was practically absent went by. In the third quarter of the year there were nine deaths from measles all in Lindley, and In the fourth quarter there were five more deaths in Lindley, and five each in the central, Fartown and Almondbury, districts. Measles is one of the most infectious of diseases, and the greatest carelessness is exercised on the part of parents in regard to it. It is looked upon as inevitable and a trifle ;—but thirty-three children died from it in the borough last year, and fifteen of these deaths occurred in Lindley. Although without the earlier information about the progress of the disease obtainable by notification, we took what measures were in our power to check its spread. Assistant-Inspector Firth visited about 200 houses in Lindley where the disease was most violent and distributed disinfectants, instructing the parents how to use them. We also communicated with the Clerk to the School Board and the teachers in the schools, and obtained their co-operation in preventing children from infected houses from attending school. Had this been done at the very beginning of the outbreak I cannot but think it might have been less virulent. It is only by taking such measures very early that any great good can be expected to result. Once measles has obtained the upper hand in a crowded neighbourhood we can do very little to arrest its spread."

In another portion of the Report Dr. Cameron writes:—

"The notification of infectious disease clause of our Act of 1880 has worked smoothly and usefully. The number of cases reported, or of which we heard through others reported, was 154. This does not include all the doubtful cases mentioned to me privately by medical men. Of the 154 cases, one, a case of small-pox from a crowded part. . . was taken to hospital, and no further case occurred. . . Eight were cases of measles, one from the Industrial Home was sent to Birkby. One other case occurred a few days later in the Home, and came into hospital during the first week of the present year (1884). Ninety-one were cases of scarlet-fever, of which forty-three were taken into hospital. Eight were cases of diphtheria, of which seven were sent to Birkby. Forty-one were cases of typhoid fever, of which twenty-two were taken to hospital. Another was a case of fever of doubtful nature. Three cases of erysipelas were isolated at home, and one case which turned out to be tuberculosis was admitted as a case of fever. It will thus be seen that the hospital at Birkby has been of the greatest service in effecting isolation. The number of admissions has been much smaller than our average. There were thirty-three cases in the hospital on the 1st January, 1883, and seventy-five new cases were admitted during the year—a total of 108 under treatment during the year. Of the seventy-five admissions one was the case of small-pox already mentioned, another the case of measles just spoken of; forty-three were cases of scarlet-fever, of whom two died; seven of diphtheria, of whom one died during the year; twenty-two of typhoid fever, of whom two died, and one of tuberculosis who died. Twenty-two were still under treatment on the 31st December."

The number of the different infectious diseases notified under the Act during 1883, and the cases removed to the Birkby Hospital, are tabulated below:—

	Cases notified.	Removed to hospital.
Small-pox	1	1
Scarlet-fever	91	42
Typhoid fever	41	22
"Fever"	1	...
Diphtheria	8	7
Puerperal fever	...	...
Other diseases	12	2
	154	74

From a communication we have received as to the behaviour of scarlet-fever with reference to the system of compulsory notification in Huddersfield, it appears that for the three years, 1874-76, before notification came into operation, the annual mortality from scarlet-fever averaged 0·93 per 1000 living; that during the years 1877-80, which included the period of partial notification under the old Act, the rate was 0·71 per 1000, and that for the years 1881-83, the first period during which notification was compulsory, quite irrespective of the accommodation available for the patient, the rate was 0·18. We are now enabled to add the rate for 1884, namely, 0·085, which gives for 1881-84 a rate of 0·16 per 1000.

The following table supplies statistics bearing upon the points hitherto discussed :—

RATES OF MORTALITY FROM CERTAIN SPECIFIED CAUSES, PER THOUSAND LIVING, FOR THE UNDERNAMED YEARS.

Date.	Estimated Population.	Death-rates per 1000 living from .—						
		All causes.	Seven principal Zymotic diseases	Small-pox.	Scarlet-fever.	Diphtheria.	"Fever"	Measles.
1874	74,150	21·39	2·73	0·04	1·05	0·23	0·32	0·40
1875	75,069	23·59	2·92	—	0·64	0·09	0·37	0·72
1876	76,072	23·18	2·78	0·03	1·13	0·05	0·38	0·21
1877[1]	77,600	22·37	2·28	—	0·83	0·08	0·37	0·30
1878	78,900	22·04	2·73	—	0·61	0·08	0·39	0·04
1879	80,245	22·95	2·78	—	1·10	0·09	0·28	0·56
1880	81,780	22·04	2·49	00·2	0·28	0·05	0·67	0·40
1881[2]	82,113	20·35	1·26	—	0·21	0·04	0·13	0·09
1882	83,271	22·38	2·63	—	0·26	0·07	0·18	0·96
1883	84,450	21·38	1·68	—	0·08	0·04	0·18	0·39

[1] Act of 1876 in operation.
[2] Act of 1880 in operation.

(*To be continued.*)

PATHOLOGICAL RESEARCHES ON DISINFECTING ACTIONS AND PATHOGENIC ORGANISMS.

At pages 23 to 39 of this volume we gave the full report of an important contribution by Professor Burdon Sanderson, F.R.S., to the last Annual Report of the Medical Officer of the Local Government Board "On the Chemical Products of Putrefaction in their relation to Disinfection." This contribution, however, only dealt in part with the subject as to which scientific investigation is being made under the supervision of Dr. George Buchanan, F.R.S., the Board's Medical Officer. In making a summary of Dr. Burdon Sanderson's labours in connexion with the questions of infection and disinfection Dr. Buchanan brings out the salient features of the enquiry, and then he proceeds to show how in the hands of Dr. Klein, F.R.S., pathological experiment has been brought to bear upon the question, and also that some substantial progress has been made in the direction of indicating what substances are most likely, by reason both of their physiological and chemical properties, to be of the greatest practical value for the purposes of true disinfection. The subject is one of such importance that we do not attempt any abbreviation of Dr. Buchanan's account of the past year's labours as to this matter. He proceeds as follows:—

"Discussing the putrefactive or septic process from a chemical point of view, Dr. Sanderson dwells upon the circumstance that many of the chemical products of the process are endowed in a very remarkable degree with the power of putting an end to the life of those minute organisms which we regard as being themselves causatively related to the septic process. He then proceeds to discuss in succession the various groups of chemical substances which are the result of the action of septic organisms, yet which thus appear fatal to those same septic organisms. Of these the most remarkable and the most interesting in relation to the present subject are included in a group of compounds which are called in the language of chemists 'aromatic,' although they possess no such property as the word would suggest to the ordinary reader. Among these aromatic products some only are disinfectant, the best known example being carbolic acid. It is, however, by no means the only, nor even the most effectual, weapon which bacteria fabricate for their own destruction, and the object which Dr. Sanderson has had in view has been to hunt out from among these substances those which, on account of their physiological or chemical properties, are most likely to be of practical value. In concluding his Report on this part of the subject he indicates the extreme difficulty which necessarily attends the exploration of a region so unknown, in which every inch of ground must be laboriously won by pathological experiments.

"That notwithstanding these difficulties some progress has been made will be seen from what follows. For reasons set forth in Professor Sanderson's papers the substances chosen were two aromatic acids, that are prepared with their compounds and subjected to all needful chemical study by Mr. Laws. These acids are known respectively as *phenyl'propionic* and *phenylacetic* ; and these were employed in very numerous experiments of which the results are recorded in further appendix to the present report.[1]

"*Researches on Disinfection.*

"Dr. Klein was the observer to whom these important researches on disinfecting actions were intrusted. In his report he begins by setting forth the method which he employed. It was based on this principle, that the question to be first answered with reference to each disinfectant, is not so much that of its ability to restrain the vegetation of any specific microphyte, as of its ability to destroy that power which the microphyte possesses of directly or indirectly producing disease. When therefore he wished to determine whether a certain chemical substance was or was not a disinfectant for a particular virus or morbific poison, he first exposed the one to the action of the other under defined conditions, then after withdrawing the virus from the antagonistic influence to which it had been subjected, he allowed it in its turn to act on the test-animal (whether rabbit, guinea-pig, or other), by the reaction of which to the poison the question of the mitigation or destruction of the poison could alone be determined. This method of interrogation showed itself to be as satisfactory in its application as it was correct in principle. Inasmuch as disinfection when real is essentially the victory of a chemical substance (therefore called a disinfectant) over an infectant poison (virus), it is obvious that the only way of testing the efficacy of any given disinfectant must be to bring it into antagonism with an infectant of known abilities and observe its influence upon the infectant.

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[1] Supplement by the Medical Officer to the Thirteenth Annual Report of the Local Government Board for 1883 [c.—4220.]

"*Anthrax Disinfection.*

"As there is no acute infective disease either of man or animal of which the etiology and pathology are so thoroughly understood as of anthrax, there could be no question as to its being better adapted than any other for an initial experiment. It is a disease of which the characteristic symptoms during life cannot be mistaken, and in which the causative relation of a microphyte (bacillus anthracis) to the observed disease has been established beyond dispute; but in addition to this it has the special advantage for the present purpose that its contagium is well known as existing in two phases. So long as it remains in the dead or living body of its victim the morbific microphyte multiplies by fission but produces nothing of the nature of seed. But from the moment it quits its airless dwelling and comes into relation with oxygen, it at once produces those minute reproductive corpuscles which biologists call spores, structures in which the potentiality of the microphyte is stored or accumulated in such sense that each spore possesses an incomparably more concentrated individual life than any part of equal size of the filament in which it was produced.

"As regards the two disinfectants,[1] the investigation having been prefaced by a preliminary determination of the physiological relation between each of them and the ordinary harmless microphytes of putrefaction, Dr. Klein proceeded to try the effect of the solution of each upon the morbific bacillus anthracis. Experimenting with this bacillus in two life phases, and commencing with its spores, Dr. Klein arrived at the remarkable result that neither solution had any effect on the virus in this phase, even when the spores were subjected to the action of the 'disinfectant' for 48 hours; for after remaining for that period in 0·5 per cent. (1 in 200) solution of either acid, the spores of bacillus anthracis were found to be still capable of producing the disease in its unmitigated form when inoculated to guinea-pigs.—The next step was to ascertain whether the agents were equally incapable of acting on the bacilli themselves. In accordance with what has already been stated, the most certain way of obtaining a liquid charged with bacilli but absolutely free from spores is to take blood which has been withdrawn from the heart of a diseased animal immediately after death, so as to be absolutely protected, both from contamination with other organisms and from access of air. With such blood Dr. Klein made an extended series of experiments, subjecting it to the action of phenylacetate and of phenylpropionate solution of a strength varying from a quarter to a fortieth of a unit per cent., with the following general results, namely: (1) that a quarter per cent. of phenylpropionate solution (1 in 400) kills the virus of anthrax in the form of bacilli (that is, as it exists in the circulating blood), even when the time during which the disinfectant acts is shortened to the utmost; (2) that blood which has been acted on by one-eighth per cent. solution (1 in 800) for 10 minutes is not rendered innocuous, but that the development of the disease in consequence of inoculation with it is relatively slower; (3) that blood acted on by one-sixteenth per cent. solution (1 in 1,600) for 15 minutes is usually, but not always, rendered innocuous; (4) that even when the solution is diluted to less than one-twentieth per cent. (1 in 2,000), the virus was rendered completely inert by from 20 minutes' to half an hour's exposure

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[1] The reader of Dr. Klein's reports may sometimes be disposed to question whether he may not have included the alkaline salts of phenylpropionic and

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phenylacetate acids in some of the references he makes to the use of those acids. Dr. Klein is not in England at the time when his report is passing through the press and enquiry cannot at the moment be made of him. But if any correction on this score be requisite it shall appear hereafter.

according to the degree of dilution. Phenylacetate solution used of the same strength, had a similar but not quite so potent an action. It was completely established as regards the agents in question that, provided the virus is free from spores, the activity of this most virulent of all contagia can be annulled by extremely minute quantities of either of these disinfecting agents, and that the time required varied with the dose. Another important result of Dr. Klein's observations, alike of pathological and of practical interest, was this, that in all the experiments the destruction of virulence was seen to correspond with the loss of vitality of the bacillus. In every case those specimens of 'disinfected' blood which, when tested pathologically, were followed by infection and death of the test-animal, were found to be capable of growing bacilli when transplanted to a suitable undisinfected soil; while all those which failed to grow them when so transplanted were also harmless when inoculated.

"*Swine Plague Disinfection.*

"The operation of these acids upon the virus of *swine plague* was also investigated, and results closely resembling those obtained by this action on anthrax virus were obtained.

"*Tubercle Disinfection.*

"With reference to the operation of the same 'disinfecting' agents on virus of *tuberculosis* the results of the experiments conducted by Dr. Klein with the assistance of Mr. Lingard . . . . were equally conclusive but much less encouraging. They go to show that the material of this disease retains its virulence even when acted on for a long time by 'disinfectants' in doses which kill the rods of anthrax instantaneously. Both as regards tuberculous virus derived from man and that derived from cattle, it was found that even half per cent. solutions were inefficacious unless the morbific material was steeped in the solution for several days. Tuberculous matter, therefore, in its power of resistance to these particular 'disinfectants,' would appear to be comparable with bacillus anthracis in its phase of spore rather than with its filaments or rods.

"*Air Disinfection in Swine Plague.*

"Passing from diseases which are propagated by artificial inoculation to the case in which the infective poison is capable of being readily conveyed through the air, Dr. Klein has given, in a second part of his paper on Disinfecting Action, the record of most interesting experiments on the use of chlorine in preventing the spread of swine plague from diseased to healthy animals at a distance. This remarkable disease, the existing knowledge of which is chiefly due to Dr. Klein, communicates itself with very great certainty through the air, so that, for example, a healthy pig placed for a few hours in the same stable with a diseased one is sure to take the disease though the animals are sedulously kept apart from each other. Dr. Klein has now made experiments as to this atmospheric communicability in a stable of which the air was impregnated with as much chlorine as the animals could endure without evincing discomfort. The experiments were so far satisfactory as bearing on the probable utility of measures of aerial disinfection, that it is proposed to repeat and develop them on a larger scale, in the hope of obtaining some available guides for actual sanitary practice.

"*Further study of Pathogenic Organisms.*

"Besides the above described researches on Disinfection, Dr. Klein contributes to the present Report some valuable additions to existing knowledge of Pathogenic Organisms; having regard always to the important question of mitigation of virus and the applicability of this knowledge to the prevention of disease by inoculation.

"*Of Anthrax.*

"It is with more special reference to problems of mitigation that Dr. Klein considers the pathology of anthrax. With reference to the virus of this disease, I have already in my last two annual reports recorded the general statements of M. Pasteur that the bacillus of anthrax can at pleasure be made to lose a portion of its potency, becoming inoculable into a susceptible animal without killing it or doing it serious injury, but with the result of thenceforth protecting it against death by anthrax when the virus of the original disease is inoculated into the animal. I have recorded Dr. Klein's failure to produce this modification of the anthrax bacillus by such means as have been indicated by Pasteur; also Dr. Klein's observations on the result of inoculation with the subcultures[1] that are issued from M. Pasteur's laboratory and sold as 'vaccin charbonneux.' Dr. Klein now upholds the conclusion[2] at which he had previously arrived, that much besides speciality of temperature is wanted for the production of that 'attenuated virus" which can protect against subsequent infection with anthrax material: and from this point he proceeds to record a number of experimental results bearing on the general question of mutation of micro-organisms. Of these results some have reference to the probable change in power produced by the passage of an infective organism through different species of animals; others (considered in his paper on Disinfection) relate to the operation on the micro-organism of the chemical agents with which he was supplied by Dr. Sanderson; and a third set are concerned with alleged transformations of micro-organisms, parasitic in various vegetable infusions, into disease-producing agents.

"In another paat of his paper Dr. Klein considers other points in the natural history of anthrax bacilli, particularly the statement that their spores can multiply without passage through the stage of rod or filament.

"*Of Swine Plague.*

"With reference to swine plague Dr. Klein has availed himself of the oportunity offered by the experiments on disinfection through the air, for the purpose of acquiring further knowledge of the pathology and etiology of this disease, which it will be remembered was first investigated by him in 1875. He has shown that the rod-like microphyte which is characteristic of it (see his further report of 1877) is to be found in all infected organs and particularly in the mucosa subjacent to the intestinal ulcers, in the diseased lymphatic glands, and in the alveolar tissue of the lungs. He has further shown that it may be cultivated in peptone solution, or in any of the other liquids which are used in his laboratory for the growth of similar organisms. By means of these subcultures the disease is readily communicable to susceptible animals. Among such animals are rabbits and guinea-pigs; pigeons are wholly insusceptible, a fact which taken along with the form and character of the microphyte, appears to Dr. Klein to indicate that M. Pasteur has been misled in his description of the virus of swine plague. When communicated to small rodents, swine plague is invariably fatal, but when produced in the pig by inoculation with cultivated virus the disease is attended with a very slight disturbance of health; the animals so affected, however, exhibit the characteristic local symptoms, and so far as has yet been possible to test them, are completely protected from subsequent attack. As, however, the number of observations on which this statement is founded is as yet insufficient, we must look to the experiments which it is proposed to make in the course of the present year for the opportunity of confirming or correcting them.

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[1] "'Subculture':—I prefer this word to 'culture' or 'cultivate,' words that in English have already appointed meanings of their own."

[2] "It is worth recording that the view announced by Klein as to the significance of Pasteur's attenuations is confirmed by recent independent observations by Dr. Koch, made on a different plan, and perhaps without quite the same completeness or precision as the observations of Dr. Klein. (See Experimentale Studien über die künstliche Abschwächung der Milzbrandbacillen und Milzbrandinfection durch Fütterung, von Dr. R. Koch, Dr. Gaffky, und Dr. Loeffler. Mittheilungen aus dem kaiserlichen Gesundheitsamte, vol. ii. p. 147.)"

"*Of Tubercle.*

"Extending his pathological researches to the study of tubercle, Dr. Klein discusses the relation of the specific bacillus, discovered by Dr. Koch in 1872, to the pathological process in artificially induced tuberculosis of the lower animals. He first describes the character of the microphyte and indicates in detail the differences which may be observed between the bacilli of human and bovine tubercle both as regards the size and microscopic appearance of the individual rod and as regards their distribution and relation to the diseased tissues. He then proceeds to give an account of an extended series of experiments made by Dr. Heneage Gibbes under his direction for the purpose of determining if possible two fundamental questions. These are, first, whether tubercle can be produced by inoculation with material not containing bacilli, and secondly, whether in the evolution of the disease in the body of the infected animal, the morbid changes are preceded by the growth of bacilli in the tissues affected.

"The first question the observers have to answer provisionally in the negative. With reference to the second point, Drs. Klein and H. Gibbes would differ from Koch in their estimate of the part played by tubercle bacilli in the production of local disease in the organs and tissues of inoculated animals. Essential as the bacilli have seemed to the success of an inoculation with tuberculous matter, yet the observers cannot consent to regard them as necessary precursors of each separate local deposit. The very various amount of bacilli to be found in one or another sort of local nodule forbids, they think, this conclusion: that is to say, in tubercles of about the same age, occurring in organs and tissues distant from the point of inoculation, it may be that they find an abundance of tubercle bacilli or that they find no bacilli at all. As the microphytes are found most certainly and in greatest abundance in those nodules which the pathologist speaks of as caseous, Drs. Klein and Gibbes are disposed to regard the caseation (a subsequent process), as being essential to the multiplication of the bacilli, rather than to think of the localisation of bacilli as an antecedent to the first formation of the nodule."

For full report of Dr. Klein's paper, see the Supplement by the Medical Officer to the Thirteenth Annual Report of the Local Government Board [c.—4220]; London: Eyre and Spottiswoode, 1884.

THE PRACTITIONER.

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Original Communications.

NATURAL RECOVERY FROM A THERAPEUTICAL POINT OF VIEW.[1]

BY J. MITCHELL BRUCE, M.D., F.R.C.P.

WHEN we attempt to formulate our conception of treatment and cure in the light of our present knowledge of pathology and pharmacology, we find that we are compelled to acknowledge a power of natural recovery inherent in the body. A similar statement has been made by writers on the principles of medicine in all ages. From the earliest times therapeutical authorities have admitted into their systems a *vis medicatrix naturæ*. "Whatever other theories we may hold," says Oliver Wendell Holmes, "we must recognise a *vis medicatrix* in some shape or other. '*Je le pensay, et Dieu le guarit*' (I dressed the wound and God healed it) was the saying of Ambroise Paré, which you may read to-day on the walls of the École de Médecine in Paris." Hippocrates expresses the same notion in the pregnant sentence, "Nature is the physician of disease."

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[1] The writer wishes this article to be regarded only as a broad sketch of a highly interesting subject, without pretension to philosophical completeness. The substance of it was delivered as an address before the Islington Medical Society at the opening of the present session.

The first words of Sydenham's Works are that "Reason dictates that disease is nothing else but nature's endeavour to thrust forth with all her might the morbific matter for the health of the patient."

The views that have been entertained of the essential nature of the *vis medicatrix* have necessarily varied much from age to age, but they have generally agreed in surrounding this natural power with an atmosphere of mystery, or have even gone so far as to personify it. It is apparently on this account that the expression *vis medicatrix naturæ* has come to be regarded as a vestige of the pre-scientific age, to be relegated with the *anima* and the *archæus* and much else that is curious to the History of medicine.

In the present paper I will attempt to demonstrate my reasons for believing, that a natural power of prevention and repair of disorder and disease has as real and as active an existence within us, as have the ordinary functions of the organs themselves; that general therapeutics is therefore as firmly founded as physiology; and that the scepticism of treatment, which is so rife in these days of active pathological research, is thoroughly unsound.

I propose to enquire (I) *what methods nature adopts* for "thrusting forth disease;" (II) *how it has come to pass that nature possesses such a power* of preventing and treating disease, *i.e.* what has been the origin, what is the essential nature, of this provision; (III) *how nature's efforts are limited*, where they demand assistance, and *how a knowledge of her methods can be applied in the art of healing.*

I. To learn the *various methods of remedy* which nature employs we must search our own body, where alone the principles or foundations of scientific treatment can, of course, be found. Let us draw our conclusions from definite and unquestionable observations.

1. We will first study a case of obstruction at the aortic orifice with simple hypertrophy of the left ventricle. The subject of this particular lesion long enjoys perfect health. The left ventricle is the seat of "compensatory" hypertrophy. This is an excellent instance of natural cure. When an obstruc-

tion occurs at the aortic orifice, the pressure within the ventricle in systole rises above the normal, in consequence of the difficulty of penetration of the aorta by the discharge; the parietal muscles are stimulated by this pressure; they respond more powerfully than usual, and the obstruction is overcome or counteracted. When the obstruction is permanent, and the increased muscular contraction indefinitely repeated, the myocardium becomes hypertrophied, the thickening of the wall being definitely proportional to the degree of obstruction. Increased work thrown on a muscle makes it act more vigorously; a repetition of the same induces hypertrophy.

This observation, familiar though it be, is of the first importance for our present purpose. It teaches us that nature may *prevent* disease (for we must remember that the subject of aortic obstruction is in perfect health) or relieve disease, *by reacting more vigorously to its cause, by counteracting it, by overcoming it.* The cause of disease, the stenosed opening, remains in existence and constantly threatening, but it is inoperative because counteracted by a natural provision—the display of greater energy.

Whence this energy comes we shall enquire afterwards; at present we have to observe that this property or power of increased activity in response to an increase of natural stimulation is readily available by the therapeutist if he desire to follow the suggestion of nature. The method founded on it is indeed constantly practised in the case of the voluntary muscles, and is known as *exercise.* But is the method sufficiently appreciated in other systems than the muscular? I fear not. Neglect of the exercise of organs and functions, indeed, appears to me to be one of the most unfortunate features of the therapeutics of to-day. Thus weakness of digestion is now fashionably treated with pepsin, ingluvin, and papayin, in endless form, and by the administration of a great variety of pre-digested, that is over-digestible food. This practice is thoroughly unsound. These means are of unquestionable value in their proper place, but they are not rational means of treating "atonic" dyspepsia. The stomach, thus relieved of work, tends to become obsolete—its glands to atrophy from disuse, its muscular coat to become still more atonic from want of stimulation to churn and propel. An entirely opposite course is the scientific, and as a matter of fact the successful one—the use of alkaline stomachics (an artificial saliva, stimulating the acid gastric juice) before food, in combination with stimulants of the palate and gastric nerves, such as aromatic bitters, wholesome wines, thoroughly appetising food, a properly arranged *menu,* and cheerfulness of company and of the general surroundings at meal times.

Another method of treatment, recently very much in vogue, is equally unsound, and for the same reason. I refer to the habitual use of saline bitter waters as laxatives. These again are valuable in their proper place, but every one knows how they "lose their effect." Instead of restoring the muscular activity of the bowels, these hydragogue waters plainly relieve them of their proper work, and render them more languid than before. Senna, castor oil, aloes, cascara, and rhamnus frangula, as well as many tonic measures directly or indirectly applied to the bowels, are the proper remedies under such circumstances.

If we go to another system—how common it is for us to meet with cases of nervous disorder, such as epilepsy, where the patient has been allowed to sink into an almost vegetable existence, through the utter neglect of bodily and mental exercise. Dosed with bromides, over-fed, coddled, with constipated bowels, disordered liver, thick urine, his muscles will hardly carry the patient up-stairs, his mind is a blank. Look at the same man a month after proper exercise of mind, muscles, and viscera has been enforced.

Once more, let me take the joints in a case of rheumatic arthritis which has been treated by rest. I do not hesitate to say that many of the worst cases of deformity in this disease are the direct outcome of treatment by rest. These cases are too often looked upon as "hopeless" (*deformans* is the specific name by which the disease is known), and they are at once put away into a corner, there to let ankylosis proceed apace. How different is the result if local and general muscular and vascular activity be secured by vigorous treatment, especially friction and systematic movement, or attempts at movement, of the affected joints.

In one department of pathology, it might be urged, the adoption of nature's plan of meeting disease by vigorous reaction, cannot be safely recommended—I mean in affections of the heart. Although we discovered this great law by studying a case of aortic obstruction, how many of us will venture to order a patient in whom compensation of this lesion has failed through indulgence in food and alcohol, free living, and sedentary habits, to take sufficient muscular exercise to develop appreciable palpitation? Is it not the fact that we often order rest and tonics for cases of big, fat, flabby hearts, with hepatic and renal disorder, which ought to be treated with low diet, active purgation, and exercise on horseback, or on the mountain or moor? Digitalis, squill, ammonia, alcohol, and convallaria all exercise the heart, and thus secure the same end in various degrees, in different ways; but for such a case as I have mentioned they are manifestly far inferior to properly regulated muscular exercise.

2. When we turn again and search nature for other methods of so-called spontaneous remedy, vomiting readily occurs to us as one of her means of preventing or relieving disorder—possibly of saving life. The cause of disease is here directly removed. The diarrhœa of indigestion is another instance of the same; so is cough; so is sneezing. The effort in this method of relief is not always a muscular contraction: it may take the form of a flow of secretion, as in the tears which wash a piece of dirt from the cornea, or of both, as in the cough and catarrh so quickly induced by bronchial irritation. We probably do not sufficiently appreciate the importance of these provisions for protecting the respiratory organs, but the question of bacillar infection is forcing their consideration more and more upon us every year.

These observations teach us a second lesson in general therapeutics—that disease may be prevented or removed by *the direct removal of its cause.* There is little need for me to insist upon this method of treatment. If it can be followed by the therapeutist in the practice of his art, it is unquestionably the most thorough and satisfactory of all kinds of treatment. But it is absolutely dependent on etiology, and herein we discover one reason why we so seldom practise it. The success of antiseptics shows how much can be done in this direction by the surgeon; the physician probably does not take sufficient advantage of the principle.

Are emetics, for instance, in sufficient repute? Probably all of us know the value of the timely use of purgatives in certain cases of diarrhœa. Certainly in these days an insufficient use is made of saline expectorants to increase the secretions in certain forms of bronchitis and asthma; or if these are given, their action is too often neutralised by opiates, which check the flow of mucus and depress the whole respiratory mechanism.

Another beautiful provision for the removal of a morbid cause directly, and one which is in interesting contrast with the method which was discussed in aortic obstruction, is the natural relief of cardiac distension, the prevention of cardiac dilatation and failure, by the depressor mechanism of the circulation. When the pressure rises inordinately within the left ventricle, the afferent cardiac branch of the vagus conveys an impression to the cardiac centre, whence it is transferred to the vaso-motor centre, and the arteries are relaxed, reducing the pressure in the aorta and thus in the left ventricle. This beautiful mechanism appears to be very active in exercise, especially in climbing. If it fail, or if the arteries become spasmodically contracted, the heart is acutely distended or even paralysed. This condition is known as angina pectoris. It was Dr. Lauder Brunton's truly scientific appreciation of these points that led him to the discovery of the value in certain cases of angina of nitrite of amyl which instantly dilates the vessels, like the depressor mechanism, and is a perfect copy of nature's method.

3. Obviously opposed in principle to increased reaction as seen in the vomiting which follows an indigestible meal, is the anorexia or actual nausea which "spontaneously cures" gastric catarrh, duodenal disorder, and hepatic disturbance. We discover in these provisions the evidence of another grand method of natural prevention and cure—the method of *rest,* which may be otherwise expressed as the method of *avoiding the cause.* So clearly has this principle been appreciated in every age, by at any rate the leaders of therapeutics, that some authorities have been induced to refer to rest almost the entire credit of natural recovery. Every one has read Hilton's classical work on *Rest and Pain*—a perfect mine of pathological and therapeutical treasure, necessarily chiefly surgical in its character. I will

not, therefore, do more than refer to rest as a natural remedy. There is not a system, digestive, respiratory, circulatory, urinary, nervous, or purely nutritive, in which rest as a natural means of treatment may not be recognised, and assisted or extended by art. Rest is in apparent conflict with the method of exercise; and the discrimination of the proper time and place for either measure is one of the most severe tests of therapeutical skill. I shall attempt to reconcile the rival methods of rest and exercise.

4. Returning to the endless field of observation which disease presents to us, we discover by an intelligent study of Bright's disease with contracted kidney another natural means or method of treatment. Three striking clinical facts stand out before the others here, namely, (1) tension of the pulse; (2) hypertrophy of the heart, with comparative infrequency of rhythm; and (3) diuresis. The tension, whatever its true cause may be, is the primary of the three. The cardiac hypertrophy is the direct result of this: the problem in hæmodynamics is the same problem as we studied in aortic stenosis, the obstruction here being the increased stress upon the aortic valves, that is, the increased blood-pressure. The fall in frequency of the heart and pulse deserves consideration. The frequency falls directly as the tension rises, and this effect is produced by a curious mechanism—the rise of pressure in the aorta being communicated to the arteries of the medulla, and there stimulating the centre of the vagus, which slows the heart by lengthening diastole. Thus, not only is the aorta less frequently filled, but *the arteries have more time to empty themselves into the veins.* The third feature of chronic Bright's disease, the diuresis which is evidenced by 60 to 100 ounces of urine daily, means increased activity of the Malpighian bodies. Now the Malpighian glomerulus, with its afferent and efferent vessel, is an arterial arrangement for filtering water from the blood under pressure. Whatever raises the pressure in the afferent vessel and lowers it in the efferent vessel, will manifestly increase the activity of filtration. These are exactly the effects of the circulatory condition in chronic Bright's disease—a powerful left ventricle, full arteries and well-drained veins. The cause and the significance of the diuresis are obvious: the glomerulus is a safety

valve in high arterial pressure. The diuresis is a bad symptom because it indicates the existence of excessive tension, but in itself it is a means of relief; just as the associated cardiac hypertrophy and infrequent pulse are also an index of morbid tension, whilst in themselves beneficial. Arrest the diuresis, and dropsy or cerebral hæmorrhage might be the result: diminish the cardiac activity, and dilatation of the left ventricle would set in.

The diuresis, as well as the infrequency of the pulse, may here be regarded as a natural remedy; and the appreciation of this fact is pregnant with therapeutical indications. It would, of course, be foolishness to rush to the conclusion that chronic Bright's disease is to be treated with diuretics; manifestly the rational treatment here consists in striking at the cause of the tension. But we are taught by this observation, (1) that in urgent cases of Bright's disease diuresis may be temporarily employed to relieve tension and the failing heart, and to prevent hæmorrhage by arterial rupture; and (2) that we ought to open other channels of natural relief to the circulation, such as the bowels and skin; whilst (3) it affords us clearer views of the action and scientific employment of diuretics in general. But beyond all these immediate conclusions, we reach a wider induction by the study of Bright's disease and similar pathological states, viz., that *the body possesses means or mechanisms for modifying or neutralising the effects of influences which it cannot directly overcome.* If nature cannot *remove* an obstacle from the arterial current (by the dilator mechanism); if she cannot directly *counteract* it (by cardiac hypertrophy); she attempts to neutralise its influence, in other words, to *remove its effects.*

Now the body is filled with provisions for preventing disorder by this means, and of relieving or modifying morbid conditions when they arise. Perhaps the most perfect of these is the mechanism for regulating the body heat, which is sufficiently familiar to all. One of the most interesting natural means of removing the effects of a morbid cause is known as *vicarious action*—one organ coming as it were, to the relief of another organ in difficulty. An intimate relation of this kind exists between the skin and the kidneys, between the stomach and the kidneys. Abundant advantage is taken of this natural provision by the therapeutist. The method has probably been learned by a purely empirical process; but we now understand the rationale as well as the value of timely purgation and diaphoresis in uræmia, and of renal activity in diseases of the skin. Every practitioner also knows the value of food and stimulants in acute pneumonia, but he may not fully appreciate the rationale of the methods he is employing. When in addition to the exhausting effects of fever, the respiratory surface is reduced by extensive hepatisation, the respiratory muscles, and in a kind of vicarious way the heart, must act with greatly increased energy, to secure oxygenation and depuration of the proper amount of blood; and we say that our chief concern in this disease is to supply the heart with force (by means of nourishment) until the fever declines and the lung begins to resolve.

These are but a few instances of the method and means of cure by *removal of the effects* of disease. I need hardly add that this is the method which in most cases we are compelled to adopt in practice. We relieve pain, relax spasm, allay cardiac distress, remove paralysis; but the vascular change, the sclerosis, the diseased valve, the tumour, remain untouched. Manifestly, as a kind of treatment, this is far inferior to removal of the cause, and to counteraction of the cause. And not the least unsatisfactory aspect of this kind of treatment — treating symptoms, beyond the direct harm which frequently follows it in the hands of the ignorant—is the ease with which it is practised, the constant temptation which it holds out to the practitioner to be content with an imperfect diagnosis, to disregard pathology (homœopathy, to wit,) and thus to stop all advance in etiology, which is the cardinal branch of medical science.

5. Lastly, when ordinary or more elementary measures have failed, and disease has wrought actual anatomical change in the body, we find nature still struggling, and struggling with success, to procure relief and cure by the grand method of *repair*. Even were space at my disposal, there is no need that I should dwell upon this great natural method of healing. Inflammation in its several degrees is no longer the "disease," the "destructive process," which many of us were doubtless

once taught to consider it. *Repair* is a happy term, bringing this truth home to us as often as we use it. Not only in surgery, but in every medical case—in the most severe case of phthisis—one can trace this process, dogging the heels of disease, shutting it out from healthy parts, closing it in with bands of impervious tissue, obliterating cavities, closing old vessels, forming new vessels, and even regenerating nerves.

(*To be continued.*)

MIGRAINE.

BY ALFRED DRYSDALE, M.B. LOND., L.R.C.P., &c.

It has been my lot to meet with a great number of cases of this curious complaint and to have had unusual opportunities of observing it narrowly. The circumstances which distinguish it from most other affections are the great violence and range of its functional disturbances, every organ and sense of the body being subject to aberrations in some instances, and the patient being reduced for the time being to a condition of *non compos mentis et corporis,* while at the same time little permanent mischief follows and it cannot be shown to depend upon any pathological lesion. Its cause, like that of most other complaints and diseases, is enveloped in mystery, and little can be said on the subject beyond that it is distinctly hereditary, affecting several members and generations of the same family; but though heredity can frequently be established, it is often also apparently absent. Migraine is sometimes correlated with phthisis usually of the more chronic variety; it affects the sedentary professional and artisan classes more frequently than the active and agricultural; women as frequently as men, and preferably persons of young adult and middle life. Enforced chastity seems in some way to predispose to it, for it is more frequently present in the unmarried and chaste, and I have very often seen it disappear after marriage. Its victims usually have some disorder of digestion of the atonic variety, but this is so frequently present in almost all persons that it is difficult to trace in it a causal relation. It has been supposed to depend upon biliousness, but I have not observed a tendency to this condition in the majority of the cases I have seen. Summer and hot weather certainly determine the periods of its attacks. Those who believe that it is of nervous origin have attempted to demonstrate its periodicity, but I cannot speak with certainty on this subject, as I have seen the greatest diversity in the intervals of its onsets. One patient had several attacks daily for a fortnight consecutively, and was afterwards entirely free for twelve months. Another supposed cause is want of sufficient sleep, and also, according to some persons, excessive sleep and especially the habit of napping during the day. With regard to diet, some have supposed that an excessive quantity of food has been a determining cause, while others think that the food has been too fatty in character or too nitrogenous, &c.

The proximate cause or direct condition upon which the complaint depends is still more uncertain. "Nerve storm" is a very fine phrase, but why should one person be afflicted with a "nerve storm" and another not? or why should a particular person have a "nerve storm" at one time and not at another? and why should the storm preferably attack a certain tract of the nerve tissue—in short, what is the cause of the "nerve storm"? To my mind the explanation appears more feasible, that the symptoms of this complaint depend upon the accumulation in the blood of a peculiar poisonous substance, possibly allied to creatin and creatinin. We know that poisons have an elective affinity for certain organs and parts of the body, and we must suppose that this substance selects the roots of the great nerves at the base of the brain—the optic, the ophthalmic, and the pneumo-gastric. The reason for supposing that the substance is allied to creatin and creatinin is the close resemblance of the symptoms produced by it to those of uræmic poisoning, which is known to depend upon the presence of those compounds in the blood. The blindness, headache, vomiting, and subsequent stupor bordering upon coma in migraine are indistinguishable except in degree from the same symptoms in uræmia. The poison, whatever its nature be, must speedily produce its own elimination, otherwise there would be no reason for the subsidence of the attack.

The first indication of the approach of an attack is frequently a curious incoherence of thought, strange ideas presenting themselves vividly to the mind in rapid succession and without any apparent connexion. Soon a certain aberration of all the senses makes its appearance ; an unusual glare, described by patients as " horrible," envelopes the field of vision, parts of it disappear while others stand forward prominently and menacingly, similar changes are experienced in the sense of hearing, certain sounds are unnaturally loud and seem to force themselves into the brain while others appear muffled and indistinct. The taste also is perverted, everything put into the mouth has a coppery flavour and the back of the mouth becomes dry and hard like a board. Speech is often much disordered, the words attached to certain ideas refuse to make their appearance or when articulation is attempted the wrong syllable or word is pronounced, the patient's enunciation frequently becomes so jerky and incoherent as to be quite unintelligible. Disorders of the muscular sense and of equilibrium often become manifest the patient experiences a sensation as if his arms and limbs would fly away from him, or as if he were about to float up into the air, or as if the earth were undulating under his feet. After a time these vague and general symptoms and sensations give place to more local and definite phenomena and manifestations. Distinct numbness and tingling of one side of the lips and tongue now make their appearance, and the same symptoms on the outer part of the thumbs, hands and fingers—these sensations being curiously enough confined in this region to the distribution of the radial nerve, also loss of sensation over the mucous membranes of the stomach and respiratory passages as evidenced by the accumulation of mucus in the latter without the production of any inclination to cough or hawk. The voice becomes husky and large quantities of tasteless eructations are discharged from the stomach. The sight now becomes definitely affected, reading becomes impossible owing to the appearance of black undulating lines radiating from a centre—these lines appear black on a white ground but fiery on a black ground ; those who delight in pompous nomenclature have given the name of "scintillating scotoma" to this phenomenon. The lines appear to be an image of the arteries of the optic disc, though why they should be perceived at this time and not ordinarily is difficult to explain. The conjunctiva at the same time becomes injected and waters profusely, usually only one eye is affected at the same time; it may be the eye on the same side as the paralysis or the opposite, I believe there is no rule in this respect. Soon the obscurity of vision disappears and is succeeded by a violent pain in the eyeball described as resembling that which would be supposed to be produced if a chisel were gouging continuously into the eyeball. Nausea is now experienced, quantities of gas are eructated, and the nausea becomes more intense till vomiting supervenes usually accompanied by diarrhœa and the profuse discharge of watery urine. The breathing now becomes very deep and slow, almost stertorous, the patient becomes extremely drowsy and falls into a sleep from which he can be with difficulty aroused during the next few hours. When he wakes he feels quite well excepting for a slight feeling of giddiness and confusion.

I have described an extreme and typical case: in many the paralyses are not present; in some the affection stops with the obscurity of vision and pain in the eyeball is not present, in others the pain and sickness are present without the obscurity of vision—in fact, any one of the individual symptoms may be absent or present in a particular case. Also, it by no means follows that the same person will always have an attack of equal intensity, it may cease at any one of its stages.

With regard to the treatment of an actual attack, a drug must be administered which from its known physiological action is certain to reach the seat of the complaint. Caffeine, theine, and guarana, to a certain extent fulfil this condition, but the ground is more accurately covered by glonoine (nitro-glycerine) and sepia. The latter I have found especially successful in mitigating an attack, though I have hitherto not yet succeeded in completely arresting one.

As a preventive, exercise regularly pushed to the point of fatigue is infallible. I have known the worst cases yield to this measure.

The prognosis is excellent, not even the most intense cases seem permanently injured by this strange malady. I have even observed that where it occurs in conjunction with phthisis, the latter has had a favourable issue.

SHORT NOTES ON THERAPEUTICS.

BY H. MACNAUGHTON JONES, M.D., F.R.C.S.I. AND ED.
Examiner in the Royal University of Ireland.

(*Continued from* p. 195.)

It is not necessary to instance many examples of the bearing of ophthalmoscopic research on general therapeutics, and the importance of a careful study of oculo-motor and pupillary changes in various disturbances, both of the vascular and nervous systems. The relation of the ophthalmoscope to general medicine has been well insisted upon by such authorities as Gowers, Hughlings Jackson, and Jonathan Hutchinson. I may be permitted, however, to refer briefly to the outlines of a few cases which well demonstrate the necessity of looking beyond the eye for the source of symptoms arising out of organic changes or functional disturbances in some other organ. I take one which has recently passed under my observation.

Over two years since I was consulted by a man, aged fifty-four years, apparently in rude health, for what appeared a subjective tinnitus of his left ear. The hearing distance was normal, the membrana tympani was healthy, while the otoscope gave a satisfactory response. On further examination I discovered a considerably enlarged liver; he had led a rather hard life, being obliged in his calling to keep both late and early hours, and had, though never drinking to excess, always imbibed a considerable quantity of alcohol. About nine months subsequently, he came complaining that the tinnitus had increased, and that the hearing of the ear was now impaired. Still there were no objective signs of aural mischief. I treated him for the tinnitus but to no purpose. A most intelligent man, he denied having at any time contracted syphilis; he had been married for years. I had not seen him for over a year when he again visited me, sent by his medical attendant, suffering from the following train of symptoms. During the first week of September, 1884, while playing a game of billiards, he saw each ball duplicated, and when in the open air, two figures on the road in place of one. This diplopia was his first ocular symptom. Next he suffered from severe pain in the region of the temple and over the left brow. Then his eyes, especially the left, commenced to squint, and marked convergent strabismus of the left eye followed. In this condition I saw him on the 21st of September. The pupils of both eyes were normal and reacted equally to light. The vision of both eyes was $\frac{20}{20}$; with either eye covered he read well with the other. The squint with the left eye was not entirely concomitant, though to an extent it disappeared on closure of the right. The urine contained no albumen or sugar, but bile was present. The liver was considerably enlarged, as I have said, and there was a butyric odour from the skin. The knee jerk was normal and continued so all through. His weight was thirteen stone one pound. The æsthesiometer revealed no anæsthesia, and there was no vertigo. He could stand on either leg (blind-folded) and walked without staggering.

The remaining history of the case I may thus epitomise, categorically enumerating the symptoms until the time of death. I may mention that the case was seen twice, in consultation with me, by Dr. Hughlings Jackson.

At first there was increase of strabismus, with violent and excruciating pain in the head referred especially to the brow, and radiating to the left side of the face; pains of the same nature were complained of in the arms, especially in the effort to raise them; these pains were marked by sudden periods of cessation, leaving him instantaneously free from all pain; there was ptosis of left eyelid (Oct. 9th); myosis of left pupil, partial mydriasis of right; the retina up to this date was healthy; the strabismus was now less marked, as the result of paralysis extending to all the ocular muscles, only slight movement of the left globe in any direction being possible; the tinnitus was most distressing; there was partial anæsthesia of the left side of the face; when he "shaves he hears the sound of the razor but does not feel it." He could not whistle. "His nose felt like an icicle." The "lower jaw drops," he says, and his speech is thick, while he has to "bolt his food" and cannot masticate so well. For this reason he eats fish and porridge, still he tastes claret, salt and sweet things, but says that a mutton chop "tastes like sawdust." Up to the middle of October the ophthalmoscope revealed no retinal changes, and he complained in no way of any visual defect. The diplopia was less distressing but the ptosis of the left eyelid was more marked. The myosis was now succeeded in both eyes by a state of partial mydriasis. Towards the end of October the vision of the left eye suddenly failed, and when I saw him early in November it was almost entirely lost in that eye. The ptosis had greatly increased, and there was anæsthesia of the conjunctiva. On examination with the ophthalmoscope well-marked signs of grey atrophy of the papillæ were present; the pupils responded equally to the action both of atropine and eserine. Pain now radiated in the peripheral branches of the fifth nerve. The flow of saliva, which had become excessive, now increased. The anæsthesia was more marked; the difficulty of swallowing anything save the softest food or liquids increased. In December the vision of the right eye was suddenly attacked, and when I next saw him (December 19th), he was quite blind, and both papillæ were in a condition of grey atrophy.

From this date all the symptoms with the exception of the pain were aggravated. Difficulty of deglutition increased, the saliva dribbled away, the face assumed a peculiar expression. As he said in a letter dictated by him to me, on January 5th, he was in a "poor plight." Several times he complained of portions of the face becoming suddenly like "frozen water," and then pricking pains were felt in the parts. The lips were tightly drawn, and, as he expressed it, "he could not get the upper lip to cover the teeth." His appearance occasionally reminded one of a patient in the early stages of tetanus. No sugar ever appeared in the urine; once only was any albumen found. I saw him again about a week before his death, his intellectual faculties were unimpaired; there was no extension of the paresis; he was comparatively free from pain, though it was with difficulty he could swallow any food; he died apparently of exhaustion. There were no symptoms indicative of further implication of the nerve-centres from this to the time of death.

In the absence of any autopsy one can only surmise from the symptoms the pathological changes which initiated and developed them. It is probable that there was a tumour, possibly gliomatous, which involved the pons varolii and perhaps the left crus, attacking successively the nuclei of the auditory, facial, sixth, third, sensory of fifth, motor of fifth and glosso-pharyngeal nerves. The hypoglossal nucleus remained almost entirely unaffected—no motor or nutritive changes in the tongue having been observed during the progress of the case. The optic atrophy probably was due to the lesion involving the optic tracts as they curve round the crura, but it must not be lost sight of that the existence of a lesion of the angular gyrus, as demonstrated by Ferrier, has been known to induce rapid loss of vision. However this may be, the retinal atrophy was undoubtedly due to a descending degeneration induced by the lesion existing posteriorly. The absence of hemiplegia or hemianæsthetic conditions excludes the possibility of any gross lesion in the region of the corpora striata and optic thalami. The comparatively slight degree of the motor symptoms indicate that the tumour had not descended deeply into the substance of the pons, but was rather of a superficial character. It would appear that the oculo-motor conditions which ushered in the subsequent train of symptoms, such as the diplopia, strabismus and myosis, were due to the irritative effects of the lesion; the paretic state developing as the disease progressed. The violent intercranial pains evidently proceeded from the nerves of the dura mater.

That the lesion did not extend deeply into the fourth ventricle is proved by two clinical facts in the case: the power of motion present in the tongue, and the absence of sugar from the urine. It may be added, however, that the present position of the localisation of cerebral disease is still so uncertain (lesions being frequently found in totally unlooked-for situations) that the diagnosis, ante- or post-mortem, in the absence of an autopsy must be grounded on purely physiological data as exhibited in the clinical features of this case. It is needless to say that all the remedies used were of no avail. Iodide of potassium and arsenic were administered, and bromides, with the use of Leclanché's battery to relieve the violent intracranial pain.

In January, 1884, I was consulted by a married lady aged twenty-four for the following symptoms. Three weeks previously she was attacked with violent pains in the head; these pains were at first of a neuralgic character, and were treated as such. A fortnight before I saw her she had to remain in bed; the pains increased in severity, she felt a numbness of the fingers and arms, and the same numb sensation was complained of in her lower extremities. One week subsequently the cranial pain became, as she described it, "agonising," and she was delirious at night. She was able to drive to my house, but was giddy and staggered when attempting to stand unsupported. There was convergent strabismus of the left eye. She complained of diplopia. There was, as she described it, a "thick fog" before her eyes and she could not discern features.

The urine was free of albumen and continued so all through. There were present urates in excess and some bile. On ophthalmoscopic examination I found both papillæ swollen, with the characteristic choked appearance. Here and there were well-defined retinal effusions, and the vessels were interrupted in their course by similar effusions. There were in the left eye a few infarctions. The case just in this condition was a most anxious one. I am happy to say by the month of March she was able to read Snellen $\frac{20}{20}$. Still there remained, even then, a certain degree of retinal hyperæmia, and the papillæ of both eyes bore evidence of the recent inflammatory changes. In this case, we have in her history, at the time of the attack, ample evidence of the cause and nature of her affection. Menstruation had been for some time irregular; she was subject to attacks of ovaritis; the left ovary was enlarged and sensitive. The menstrual period preceding the occurrence of the ocular trouble was scanty and had only lasted thirty-six hours. This might have been accounted for by exposure to cold in travelling at the time. Then followed cerebral hyperæmia, and a descending neuritis, with congestion of the papillæ.

The treatment mainly consisted of the administration of iodide of potassium in large doses, followed by liquid extract of ergot. The eyes were protected from the light, and kept for over a month under the influence of salicylate of eserine. The temples were vesicated. At the ensuing period she was placed under the influence of bromide of potassium and the skin over the ovaries was counter-irritated. Finally she was given dried sulphate of iron, quinine, and arsenic. The bowels were carefully regulated.

I recently saw a patient who consulted me for symptoms of asthenopia and general conjunctival congestion. The eyes had an injected appearance, there was marked hyperæmia of the retina and papillæ. There was a low degree of myopia with astigmatism. The menstrual periods were fairly regular but she complained that all her symptoms were aggravated during the catamenial flow, and her husband stated that at these times he noticed, ever since marriage, that the eyes became red and irritable, and she could not attempt to read. These symptoms have since quite disappeared with the use of cylindrical lenses and the temporary abandonment of near work.

In a fatal case of leukæmia in which I was some time since consulted, the young lady's friends were first aroused to a sense of danger by the sudden loss of vision of one eye; an ophthalmoscopic examination revealed a state of thrombosis of the arteria centralis. Here the wax-like appearance of the entire body was accompanied by the characteristic white look of the retinal tunic. The friends were deceived inasmuch as she had not lost flesh. There was no emaciation. There was venous pulsation in the retina of the affected eye. A mitral murmur was present. She died of pernicious anæmia. Up to the time of death there was no œdema. "The life of all her blood was touched corruptedly."

It is worthy of note that the visual symptoms supervened when she was taking Turkish baths. I have elsewhere referred to the danger attending the use of the hot bath when there is retinal congestion, or where any symptoms of cerebral hyperæmia are present. In one remarkable case in which visual disturbance with headache occurred, the lady, without advice, took a warm bath. She was seized while in it with apoplectic symptoms from which she never rallied.

As an instance of the effect of mental shock or suppressed grief, I may cite the case of a lady whom I saw quite blind in one eye, in whom the loss of vision followed the sudden news of the suicide of a near relative. When I examined the retina some time after the occurrence there was a large circular atrophic area in the region of, and destroying the macula. This must have followed on a thrombus or retinal infarction which occurred at the time. She was subsequently iridectomised, with what object I cannot say, and lost her eye as the result of the operation. I have an ophthalmoscopic drawing taken from a sketch made at her first visit to me.

As examples of the value of pilocarpine when subcutaneously injected I might briefly cite two cases. Some years since a hospital patient consulted me for the most severe syphilitic headache. He had symptoms of a syphilitic lesion in the corpora quadrigemina. He finally passed on to complete optic atrophy. But I never remember seeing a patient suffering from such violent cranial pain as this man. It was simply marvellous the relief afforded, almost instantaneously, from the injection subcutaneously of $\frac{1}{5}$ to $\frac{1}{2}$ of a grain of muriate of pilocarpine. I must have injected this man some forty or fifty times without any bad effect, and he used to crave for the injection.

In the other case there were congested and swollen papillæ. There was at times also violent cranial pain. There was no history of syphilis. But he had before I saw him an attack of delirium tremens, and took alcohol in excess for some time. He had pilocarpine injected subcutaneously every day. In this case also the headache was at once relieved by the pilocarpine. He completely recovered his vision. Notwithstanding some unpleasant reminiscences connected with the use of this drug, I feel that in cases of excessive vascular tension and vaso-motor irritation, especially in ocular conditions, it is not as frequently resorted to as it ought to be.

How rapidly hyperæmia and retinal congestion may ensue from gout may be learned from a reference to the following case. Some years since I was attending a gouty patient for a sudden attack of his old enemy in his foot. I was hurriedly sent for in great alarm. During the night violent pain attacked both eyes. In the course of twenty-four hours he was quite blind. Free leeching and large doses of iodide of potassium and saline purgation rapidly relieved him. Vision was perfectly restored.

TREATMENT OF ULCERATION OF THE BOWELS IN YOUNG INFANTS.

BY F. P. ATKINSON, M.D.

It cannot I think be questioned that speedier and more accurate information as regards the effect of remedies may often be gained from the study of chronic than of acute disease, inasmuch as the same symptoms are apt to recur again and again, and the same remedies can be put to oft-repeated tests. The following case, which I have ventured to report, has given me an amount of information it might otherwise have taken years to obtain, and possibly it may prove of service to others who have cases of a like nature under their care. According to the mother's statement the child in question had been given up by more than one physician, and I must say myself it was one of the worst cases I have ever seen recover. At the time the little one came under my charge she was two years and eight months old. She was a perfect skeleton and quite unable to sit up in the nurse's arms. She had a sallow waxy appearance, without a particle of colour about her face except a slight hectic flush upon her cheeks. She was sick whenever she took food, which consisted entirely of milk and lime-water. The bowels were moved about every four hours and the smell was perfectly unbearable. The stools consisted almost entirely of slime and pus, streaked with blood, and adhering to the bottom of the chamber vessel even when it was held upside down. The stomach was slightly distended and tender. The previous history was as follows:—

She was always rather sick from birth, but was worse after she was one year old. Had an attack of diarrhœa at eight months and the urine was discoloured (so the nurse says) with blood. She has always been troubled with diarrhœa on and off since. The stools were at first very large in quantity and semi-solid but not slimy. When the diarrhœa was at its worst, the actions occurred about every two hours, but the usual number of times was about once every four hours. The stomach was always more or less tender and distended. At twelve months old she had pains in the joints, and one knee had to be put up in a splint; both legs were much swollen. The father had had syphilis before his marriage, but was said to be perfectly well when this took place. The child was nursed for about four months, but occasionally had a bottle of Swiss milk, then on account of sickness was fed entirely on Swiss milk and Savory and Moore's food for infants till twelve months old, then all kinds of milk were tried, goat's, ass's, &c., and subsequently farinaceous food with a little Brand's essence of beef. When I saw her she was taking cow's milk and lime-water, and this was in great measure brought up as soon as it was taken into the stomach.

The indications for treatment appeared to me to give a light and easily digestible food, moreover one which after digestion would leave as little waste material as possible, to soothe the irritation of the bowels, and to improve the condition of the blood. As a diet, therefore, I ordered two tablespoonfuls of whey, two tablespoonfuls of barley-water, and one tablespoonful of cream to be taken at each feeding, and in the course of twenty-four hours I found she managed to dispose of half a pint of barley-water, half a pint of whey, a quarter of a pint of cream, together with, later on, one and a-half ounces of milk. She also took in the twenty-four hours the white of four eggs beaten up in water, four teaspoonfuls of Brand's liquid essence of beef, and two ounces of finely-minced raw meat. I ordered the body to be thoroughly oiled night and morning, the loins and stomach to be kept warm with a flannel bandage, and the feet to be well wrapped up. In order to alter the character and frequency of the secretions, I gave three times daily a mixture consisting of the following: one minim of solution of potash; eight minims of castor oil; three quarters of a minim of tincture of opium; twenty minims of syrup of ginger, and half a drachm of mucilage. Then when the pus and slime began to pass away and the bowels appeared simply relaxed, I gave two grains of bicarbonate of soda; three grains of subcarbonate of bismuth; half a minim of tincture of opium; five minims of tincture of catechu; two minims of tincture of rhubarb; five minims of compound tincture of cardamoms with a little syrup and mucilage every four hours. Next, in order to improve the condition of the blood, as soon as the secretions began to improve I ordered ten minims of the concentrated syrup of the lactophosphate of lime and iron to be given in water three times daily.

The child was ordered from the start to get plenty of fresh air provided it was dry, and the rooms in which the child lived and slept were requested to be kept quite dry, and at the same time thoroughly clean and ventilated. In the course of about one and a-half years the child under this treatment made a good recovery and was able to run about by herself and eat the same as any other child. The vomiting ceased almost entirely from the time that the milk was given up. Whenever the secretions became purulent and slimy the castor oil and laudanum mixture was resorted to, and the carminative and astringent one when the bowels were simply a little relaxed. The castor oil and laudanum was successful in altering the character of the secretions not simply once or twice, but on several occasions, and I have applied it since in other cases with uniform success. As regards the lactophosphates, I cannot speak too highly of them in aiding the subsequent recovery. As Dr. Dusart states, they act as general excitants of all the nutritive functions, insure digestion, bring back or increase the appetite, and generally improve the vital energies.

RESEARCHES RELATING TO THE PATHOLOGY AND TREATMENT OF CHOLERA.

BY T. LAUDER BRUNTON, M.D., F.R.S., AND P. H. PYE-SMITH, M.D.

(*Continued from* p. 201.)

8. *Has the infective matter much power of resistance, and can it pass into a resting state?*

9. *Is it destroyed in a short time by drying?*

The Sanitary Conference in 1874 concluded that it results from a study of the facts that in free air the generative principle of cholera rapidly loses its morbific activity, but that in certain conditions of confinement this activity may be preserved during an undetermined time. Great deserts form a very efficacious barrier against the propagation of cholera. This disease has never been imported into Egypt or Syria across the desert by caravans from Mecca.

The infective matter of cholera, according to Koch, differs entirely from that of anthrax or vaccine in so far that while the virus of the latter diseases will retain its activity for many years when dried, that of cholera is rapidly destroyed by drying. This he considers to be a strong argument in favour of the identity of the cholera virus with the comma-bacillus, as he found that the bacillus was killed very rapidly by drying.

10. *Can the infective matter enter the body in other ways than through the alimentary canal?*

It is possible that it might enter through the lungs, but at present there appears to be no proof that it does enter in any other way than through the alimentary canal.

11. *Is a special individual predisposition requisite in order to allow the infective material to become active?*

The general view of the Conference of 1866 on this question is thus summarised by the Medical Delegates:—

"Although the Conference recognises the diffusion of the disease by human intercourse, it also admits that *unhealthy local conditions* intensify cholera epidemics. These prevail mostly in places with overcrowded populations condemned to breathe foul air, to drink impure water, and to live upon soils impregnated with decomposing organic and especially fœcal matters. The Conference therefore does not think that transmissibility is the sole point to be guarded against, but that the utmost care should be taken that when cholera is introduced into a place it does not meet there a soil favourable to its development."

12. *How long is the stage of incubation?*

The Commission of 1866 concluded that "in almost every case the period of incubation—that is to say, the time which elapses from the moment when an individual has contracted the choleraic infection to the commencement of the premonitory diarrhœa or of confirmed cholera—does not exceed a few days. All the facts cited of a more prolonged period of incubation refer to cases which either are not conclusive, or in which the premonitory diarrhœa has been included in the period of incubation, or in which contamination (the contraction of the choleraic infection) has occurred after departure from the infected place. Observation shows that the duration of the choleraic diarrhœa called premonitory—which must not be confounded with other kinds of diarrhœa that may exist where cholera prevails —does not exceed a few days."[1]

According to Professor Hirsch the usual time of incubation is three to four days, or sometimes shorter, but is never so long as five days.

13. *Does recovery from one attack of the cholera give protection for a certain time against another?*

An attack of cholera appears to confer a certain amount of protection against a second, but this immunity is not absolute. It has repeatedly happened that persons have been attacked two or three times by cholera in different epidemics, and have finally died of the disease. It seldom, however, occurs that the same patient is twice attacked by cholera in the same epidemic, although such cases sometimes occur.

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[1] *Practitioner*, vol. xiii. 1874, p. 222.

14. *Is the infective matter of cholera identical with the comma-bacilli?*

The mode of propagation of cholera by human intercourse and the apparent multiplication of the poison in the body is strongly suggestive of an organism being the cause of the disease. Many attempts have been made to find such an organism.

At the International Medical Congress at Vienna in 1867, the report of Hallier, De Bary, and Thomé, stated that they found in cholera evacuations and in the intestinal mucus of the dead body, definite organic structures consisting of excessively fine granules clustered more or less densely together in the jelly which surrounded them. The granules divide and subdivide to form beaded threads which interlace in immense numbers into agglomerated masses in the mucus. By sowing and cultivating these organisms, Thomé and Hallier after some time obtained larger round cell-like bodies which rapidly multiplied, and also abundant filamentous fungi on which grew cylindrical spores capable of developing again into filaments.

Dr. Parkes observed peculiar corpuscles about the size of white blood corpuscles, finely granular on the surface, and containing from six to twelve dark yellow or black granules. He also saw vibriones in great numbers, and two or three oval transparent bodies placed end to end.

The whole question was re-examined by Drs. Lewis and Cunningham, who concluded that no special fungus is developed in cholera stools, that the fungus described by Hallier is certainly not confined to such stools, and that the resting and active conditions of the observed granules are not peculiar to this disease, but may be developed in nitrogenous material even outside the body. They think that no sufficient evidence exists for considering that vibriones and such like organisms prevail to a greater extent in the discharges from persons affected with cholera, than in the excreta of other persons diseased or healthy. At the same time they consider that it is not proven that the vibriones, bacteria, or monads (micrococci) may not be peculiar in their nature, and may not, under a peculiar combination of circumstances, be capable of giving origin to peculiar morbid phenomena in predisposed persons.

The whole question was thus left entirely open, and in the epidemic of 1883-84 Dr. Robert Koch, along with Drs. Gaffky and Fischer, again attempted to discover an organism which might be regarded as the cause of cholera. In anthrax, which we know to be due to *Bacillus anthracis*, the organisms are found in the blood and tissues. One might have expected, then, to find organisms in the blood of cholera patients also, but this is not the case, for Koch found that the blood and tissues generally were quite free from any organisms, and this conclusion has been confirmed by the recent researches of Klein and Gibbes. Koch therefore directed his attention to the intestinal canal. In the intestine different anatomical appearances were observed. In comparatively few of the cases observed by Koch was the mucous membrane little altered; it was somewhat swollen and less transparent in its superficial layers; the solitary follicles and Peyer's patches were prominent. The whole mucous membrane was a light rosy red, but nowhere was there any capillary extravasation. In these cases the contents of the intestine were colourless, but were rather like thick soup than like rice-water, and only in one or two cases did Koch observe a pure watery condition of the intestinal contents with mucus and a few flakes. In other cases redness was observed surrounding the follicles and Peyer's patches. In others the redness was more extensive but occurred only in spots, while in others again the lower part of the small intestine was of a dark reddish-brown colour with superficial hæmorrhages and in many places superficial necrosis and "diphtheritic" patches occurred. The congestion was most intense immediately above the ileocæcal valve, and higher up gradually diminished. In such cases the contents of the intestine consisted of sanguinolent stinking fluid. This congested condition of the mucous membrane appears to be of a secondary nature and allied to the so-called diphtheritic conditions which occur in typhoid fever or other diseases with ulcerations of the intestines, rather than anything specific to cholera. In this condition the stinking contents of the intestine were found to swarm with bacteria of many sorts, as might be expected wherever putrefactive changes exist. On examining, however, some acute and uncomplicated cases where there was no bleeding, and where the contents of the intestine were not decomposed, Koch observed that the more uncomplicated and fresher the cases, the more did a definite kind of bacterium present itself in the intestine. These bacteria, which he named "comma-bacilli," on account of the peculiar form, are about two-thirds as long as tubercle-bacilli, but blunter, thicker, and slightly curved. This curving is usually slight, but sometimes so great that the baccilli have a semi-circular form.[1] In other cases the curve is a double one, one comma sticking to another so as to form an S.

When cultivated the comma-bacilli frequently grow into threads; these threads are not straight as in the case of other bacilli, *e.g.* bacillus anthracis, but form long corkscrews which in their length and general appearance so closely resemble the spirochæta of relapsing fever that they could not be distinguished from one another. Koch therefore considers that the comma-bacillus is not a true bacillus but a transition form between a bacillus and a spirillum, or possibly a true spirillum. Klein regards the comma-bacilli as true vibriones. The comma-bacilli are readily cultivated, and grow well in broth, serum, milk, or upon gelatine, agar-agar, and potatoes. They grow rapidly, their growth soon reaches a maximum, remains a short time stationary, then quickly diminishes. The dying comma-bacilli lose their form, will no longer stain, and sometimes appear shrivelled and at other times swollen. When the comma-bacilli from cholera dejecta are kept moist on earth or on linen, they grow very rapidly during twenty-four hours, and any other bacteria which may be present are so completely overgrown by them that a specimen from the earth or linen, is almost a pure cultivation of cholera bacilli. This vigorous growth does not last long. After two or three days the comma-bacilli begin to die, and other bacteria increase. The same condition occurs in the intestine. The comma-bacilli very rapidly increase, but after a short time, and especially when transudation of blood occurs into the intestine, they again disappear, and in place of them other bacteria, chiefly putrefactive bacteria, develop. The comma-bacilli are aerobious and will not grow when deprived of air. Koch has found no resting condition; they are short-lived, and are rapidly killed by drying—a fact which he regards as of great importance.

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[1] It is worthy of mention that Dr. Koch's first description of a micro-organism in the cases of cholera he examined in Egypt was of a straight bacterial form. The so-called comma-bacillus is distinct in form and size, and was discovered in India.

In considering the relationship of the comma-bacillus to cholera, Koch discusses three possibilities:—first, It might be said that the disease favours the growth of comma-bacilli by preparing for them a suitable soil; second, It might be supposed that the disease produces conditions under which one or other of the bacteria which usually occur in the intestine becomes so altered as to assume the form and qualities of the comma-bacillus; or thirdly, We may suppose that the disease is due to the comma-bacilli acting upon the organism. If the first hypothesis were correct and the abundant presence of the comma-bacillus in cases of cholera were due to the disease preparing a suitable *nidus* for it, one would have to assume that cholera-bacilli were originally present in everybody who took the disease in whatever quarter of the world he might be, and to whatever race he might belong. According to this assumption the comma-bacillus would be one of the widest distributed and commonest of microbes. But the contrary of this is the case, and Koch was unable to find them either in the bodies of healthy persons, of those suffering from other diseases, or outside of the body in places which were most suitable for the development of bacteria. The second hypothesis, that some of the bacteria ordinarily present in the intestine alter their form under the conditions produced by the disease, is contrary to all that we know about pathogenic bacteria, for in cultivations of anthrax-bacillus for example, the virulence of the anthrax poison may be mitigated by cultivation, but the form of the bacillus remains the same. Koch therefore comes by exclusion to adopt the third hypothesis as correct, viz., that the comma-bacilli are the cause of cholera. His observation that comma-bacilli are of constant occurrence in the rice-water stools of cholera patients has recently been confirmed by Klein, Gibbes, and Lingard, according to whom the cholera-bacilli vary greatly in numbers in different stools, and in different cases, sometimes being exceedingly scarce, at other times numerous.

This observation tends to confirm Koch's belief in the causal connexion between the comma-bacillus and cholera: but on the other hand Lewis has found comma-shaped bacilli not only in other intestinal diseases but in the mouths of healthy persons; and Deneke has found them in some articles of food, such as stale cheese.

These observations render it possible that the first hypothesis discussed by Koch may after all be correct: that cholera is not caused by the comma-bacilli, but that they are present in the disease, because it furnishes the conditions favourable for their growth and development. Instead of being the cause of the disease, the comma-bacilli would thus be its consequence. To this, however, Koch objects, that although the bacilli observed by Lewis and others are comma-shaped, they are not the same bacilli as he has observed in cholera. In order to establish their identity, other methods must be employed. We can readily understand the impossibility of deciding on the identity or distinction of various bacilli by their microscopical appearance alone, if we consider how difficult we should find it to distinguish between Europeans in their ordinary garments and naked savages from New Guinea, if we had to observe them through the wrong end of a telescope, so that their apparent size was smaller than the sting of a wasp. We might see a slight difference in their general size and contour and yet be quite unable to decide definitely about them. If we were to throw whitewash over them we might find the distinction easier, because the whitewash would stick to the clothes of the European and wash off from the savage. We use a similar method to this in distinguishing bacilli by staining. But even the staining process might be insufficient, and then we should be obliged to have recourse not to appearance but to behaviour as a method of distinction. Although we might be unable to distinguish the individual European or individual savage; if we watched a colony and a horde of savages, we should probably see that the one built themselves huts while the savages built none. We should thus distinguish a colony although we could not distinguish the individual. In the same way, by watching the growth of colonies of bacteria, we may distinguish them by the mode in which they grow and the effect they produce upon the nutrient material, whether it be milk, broth, or gelatine. Lastly, peaceful colonists would not harm their neighbours, while savages would kill them. Similarly we are sometimes able to judge of the character of bacteria by inoculating animals with them and seeing whether or no they produce disease. According to Koch, the comma-like bacilli which have been found in healthy persons, or in other cases than those of true Asiatic cholera, differ from those of cholera in their mode of growth. The comma-like bacillus found by Lewis in saliva is according to Koch larger, thinner, and less blunt at the end than the cholera-bacilli, the ends of which also take up the stain less deeply than the middle of the bacillus. The chief difference, however, is that Lewis's comma-bacilli do not grow in neutral or slightly alkaline peptonised gelatine broth, while the cholera-bacilli do. Another comma-bacillus, described by Finckler and Prior, differs also in its growth from the cholera bacillus. It is blunter and larger than the cholera-bacillus, and grows more rapidly and more freely in gelatine especially upon potatoes. The colonies in gelatine seen under a low power have always a regular round form, a fine granular appearance, and they liquefy the gelatine very rapidly, and so widely that when only a very few colonies of bacilli are on a gelatine plate, they liquefy the whole of the gelatine in two or three days. The cholera-bacilli on the other hand form in gelatine colonies which are not regularly round, which consist of strongly refractive particles, which grow comparatively slowly, and liquefy the gelatine only for a small distance around them. The difference is seen still more distinctly when they are cultivated in a test-tube. A colony of cholera-bacillus develops at ordinary temperatures slowly, the point of inoculation sinks into the gelatine, but liquefies the surrounding gelatine so little that a peculiar appearance is presented as if a bubble of air were at the point of the inoculating puncture. The lower part of the puncture remains for days quite thin and looks like a white thread, because the liquefaction of the gelatine goes on very slowly from above downwards. The comma-bacilli described by Finkler and Prior when cultivated in a similar manner liquefy the gelatine in two or three days widely and regularly round the point of inoculation, so that in a very short time it no longer appears like a thread, but rather like a long sack or stocking. A deep depression, or formation of a bubble, is never observed at the upper end of the puncture.

Koch's opinion on this point is not shared by Klein, who says, "The behaviour of the comma-bacilli in artificial media is not such as to justify their being considered specific. They grow well in alkaline and neutral media, are not killed by acids, and their mode of growth in gelatine mixtures is not more peculiar than that of other putrefactive bacteria; they show marked differences when grown in different media, but not more so than the ordinarily putrefactive bacteria when compared in their growth with one another."

So far, then, as observation by the first three methods go, viz. by observation of their size and form, of the way in which they become stained, and of their mode of growth in nutritive media, we are unable to regard the comma-bacilli obtained by Koch from cases of cholera as being distinct from other bacilli of a similar form obtained elsewhere. The only way in which they can satisfactorily be proved to be the cause of cholera is by finding that they will produce similar symptoms. Hitherto the experiments in this direction have been unsatisfactory, and have generally given a negative result.

As we have already mentioned, the experiments of Tiersch and Sanderson are not conclusive, inasmuch as they were not made with pure cultivations of cholera-bacilli, and might have been due to poisoning by ptomaïnes formed by other bacilli. Koch's experiments at first nearly all failed, and he was unable to produce symptoms resembling cholera by the injection either of cholera dejecta or of cultivations of the comma-bacillus into the blood or intestine. In the last epidemic of cholera in Marseilles, Professors Rietsch and Nicati succeeded in producing symptoms of cholera, with fatal issue, in dogs and guinea-pigs by tying the common bile-duct[1] and injecting a certain quantity of a pure cultivation of comma-bacilli into the duodenum. They afterwards succeeded in obtaining the same result in guinea-pigs without ligature of the bile duct.

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[1] This preliminary operation was to imitate the absence of bile in the intestines during cholera.

These experiments have lately been repeated by Koch. He took a pure cultivation of the cholera-bacilli and diluted it so much that the quantity injected hardly contained the hundredth of a drop of the cultivation-fluid. The fluid was injected into the duodenum without previous ligature of the bile-duct. With a few exceptions the animals died in from one and a half to three days. The mucous membrane of the duodenum was reddened, its content was watery, colourless, or of a slightly red colour, and contained flakes. In the contents of the intestine comma-bacilli were found as if in a pure cultivation and in extraordinary quantities. Here then the same appearances were presented as occur in the intestine of fresh cases of cholera. In these experiments it is impossible that poisoning could take place by the action of poisonous products contained in the cultivation-fluid, because the quantity of it which was used was so very small. One must assume then that the animals died here in consequence of the organisms which, although introduced in such minute quantity, multiplied in the body. Before, however, these results can be finally accepted, the experiments must be repeated and extended, more especially as Klein, in the abstract of his paper before the Royal Society, says that the experiments of Koch and others on animals can be explained in a manner opposed to that of Koch. Both Koch and Klein have found peculiar small bacilli in the intestines of cholera patients, but neither of these authorities appear to attach any special importance to them.

At present then we have no conclusive evidence that any single definite organism is the cause of cholera, and the cause of the disease yet remains uncertain, although we may still believe that cholera is due to certain organisms which are capable of reproducing themselves in the body and thus extending the disease.

There is, however, another possibility which we have not yet discussed: that the cholera poison is not an organised ferment but an enzyme; that, instead of being a living organism like the torula of yeast, it is a chemical substance without life, like the pepsin of gastric juice. One great difference between the torula and pepsin is, however, that the torula increases in quantity during the time that it is acting as a ferment, while pepsin does not. It is very remarkable, however, that a minute quantity of pepsin is able to go on digesting enormous quantites of fibrin, and seems to undergo but very little diminution after its work is done. It is usually supposed that this is due to the ferment becoming free again after it has digested the albuminous substances, but it is just possible that there may be a process of re-formation of pepsin during digestion, although of a different kind from that of the torula. It is conceivable that, during digestion of albuminous bodies, the pepsin which was at first added is actually destroyed in the process, but that the chemical changes which go on in the albuminous substance are of such a nature as to form new pepsin in nearly the same quantity as at first. The disappearance of pepsin from a digestive fluid in the first stages of digestion, and its reappearance after the digestion is over, is usually explained on the supposition that pepsin enters into combination with albuminous substances and again becomes free when they are digested, and that the same pepsin which at first enters into combination again becomes free when the albumen is digested; but the facts might also be explained on the supposition that pepsin was formed anew. It is much the more probable that cholera depends upon the presence of an organism, but if no organism could be found, the possibility of a non-organised ferment capable of multiplication would have to be considered.

(*To be continued.*)

COD LIVER OIL AND LIME WATER IN SCALDED THROAT.

BY H. D. PALMER, M.R.C.S.

So many little children die annually, especially amongst the poor, from drinking from the spout of a boiling tea-kettle, that a simple plan of treatment, which saved the life of a little child under my care a short time back, is perhaps worthy of record.

I was sent for to see Alice B., aged three, who when the mother was out of the room had attempted to drink from the spout of a boiling tea-kettle, which stood on a low fire-place about level with its face. She had succeeded in taking enough into her mouth to scald the throat most severely, and when I got to the house I found the little patient collapsed, livid in the face and evidently dying from shock. The mouth was so swollen and scalded I could form no idea as to the extent of the injury to the throat. I thought the child would not recover but determined, as it could not take food of any sort, to give it equal parts of cod liver oil and lime water as much for the sake of a dressing to the injured parts as for the nourishment the oil would afford. I ordered it to be fed with a teaspoonful every hour, and from the first the beneficial effects were truly marvellous, the pain was evidently relieved by keeping the scalded surface constantly coated with this novel Carron oil, and as the child at first only swallowed with difficulty it was longer in contact with the inflamed mucous membrane. In three days the child began to take notice, and in about a week afterwards all the distressing symptoms of difficulty of breathing, which had made me fear for its life at times, had vanished. As it improved I added milk to its diet and gradually reduced the oil and lime-water. It recovered completely.

ON A CASE OF PARASITIC DISEASE OF THE STOMACH.[1]

BY G. CECIL DICKSON, M.B., EDINBURGH.

In the *Practitioner* for March there is an interesting note regarding gastris favosa, a new disease, depending on the presence of parasitic fungi in the stomach and intestines. The following case may be interesting to the readers of the *Practitioner*, although the parasite present belonged to the Schizomycetes and not to the Mucorinæ, as in the case of Professor Kundrat just mentioned.

H. M., aged 21, dairymaid at a farmhouse; was strong and healthy until April 1884, when she took ill with abdominal pain and fever. These symptoms soon subsided and she returned to her home at another farm, and began to suffer there from what was afterwards her most prominent symptom—vomiting. At first it came daily, usually in the morning, and the matter ejected was greenish and watery, but it afterwards grew more frequent and she became gradually weaker. Varied treatment was tried by several medical men but with no alleviation. In November she was, through weakness, almost entirely confined to her bed, and her condition then was as follows:—In appearance thin and anæmic; temperature normal; pulse always rapid, usually 100, regular, small.

Alimentary System.—Deficient appetite, moderate thirst tongue foul in mornings, when it and the teeth were coated with slimy material, pain in stomach, occasionally after food, flatulence and eructations before vomiting. No marked dilatation of the stomach detected by percussion, abdomen not distended, vomiting came on three or four times a day—it occurred at most irregular intervals—sometimes at night, occasionally in the morning before breakfast, never immediately after food. In time it appeared to have no relation to any stage of the digestive process. Quantity vomited was very large, sometimes three pints on each occasion. In colour and consistence it was like pea-soup, being yellow and with a deposit forming about one-third of the whole; not fœtid. No frothiness visible. Not at all mucous in character. Acid in reaction but not strongly so. It was examined microscopically shortly after being vomited into a clean vessel, and the objects observed were the following:—

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[1] Read at the Quarterly Meeting of the Forfarshire Medical Association at Dundee, January 1885.

Starch corpuscles and granular matter. (The diet at this time was confined to milk and toast.) The most marked objects were numerous rod-shaped bodies, which by their shape and uniform dimensions were at once recognised as a kind of organism, in fact bacilli, and there was noted in regard to them:—

1. Size: length averaged 1½ times the diameter of a red blood-corpuscle, several were longer and were evidently formed by the union of several segments; their breadth was constant, they were thicker than the rods of bacillus anthracis or subtilis.

2. Shape was cylindrical or rod-shaped, the ends of which appeared square cut. No flagellum visible by a power of 800. Motionless.

3. Spores were seen inside the bacilli, giving some of them an annulose appearance, some also separate.

4. They stained readily with Bismark-brown, gentian-violet, methyl-aniline; less so with eosine, not with iodine.

No other microscopic object, no sarcinæ, no torulæ. After each attack of vomiting there was immediate relief felt from a previous uneasiness in the abdomen. There was constipation and the stools were clay-coloured. She had leucorrhœa and the urine was at times fœtid and ammoniacal. Anti-parasitic treatment was then begun: 15 grains of sulpho-carbolate of sodium were given after each attack of vomiting. There was immediate relief to the uneasiness described above, and the vomiting became less frequent, and when examined the organisms were less numerous. In a few days the vomiting ceased, and since then she has improved up to perfect health, and has now no gastric symptom.

Remarks.—From the enormous number of the bacilli in the vomited matter, and from the fact that the symptoms, previously obstinate, disappeared rapidly when the treatment was directed to their destruction, there can be little doubt that these organisms had a close relationship to the disease. It is not necessary to assume that they were the primary cause, that is improbable, as a healthy gastric juice would be intolerant of such organisms. The illness commenced with symptoms pointing to an inflammatory process in the abdominal organs, and it is possible that there in the perverted secretions, the bacilli obtained a firm holding. They would then multiply and their presence would stimulate the gastric glands to secrete, and thus would be formed the large quantities of vomited matter, for it was remarked, both by the patient and her friends, that this was very much in excess of what was eaten and drunk. When the fluid in the stomach reached a certain quantity, the abnormal stimulation of its nerves would lead to vomiting, and this was therefore a salutary process getting rid of vast numbers of parasites, and indicates how symptomatic treatment to allay vomiting could only increase the abnormal condition. That the secretion would be perverted is certain, that the rapid pulse and other symptoms might be due to absorption of some alkaloid formed by them is probable. The pale colour of the stools would indicate an interference with the formation of bile in the liver by some abnormal ingredient in the blood of the portal vein.

In regard to treatment the mode of giving the parasiticide is important. It was given after each attack of vomiting, when the stomach would contain many fewer organisms and when it would act in a concentrated manner. It was also given in the mornings for several days after vomiting ceased.

With reference to etiology there was no source for the bacilli in the food or drink, no other cases in the neighbourhood, no disease in the cows of the farm, nor any other evident external origin. One may conjecture their source to be in some of the organisms naturally existing in other parts of the alimentary tract in small numbers, and under certain favourable predisposing conditions, thriving and reproducing themselves in the cavity of the stomach and thus giving rise to a disease.

Reviews.

Tumours of the Ovary, Fallopian Tube, and Broad Ligament. By ALBAN H. G. DORAN, F.R.C.S., Assistant-Surgeon to the Samaritan Free Hospital, &c. London: Smith, Elder, & Co. 1884.

THIS book is a valuable addition to the literature of abdominal surgery, and supplies that basis of precise pathological information, without which no surgeon should attempt the treatment of the diseases discussed.

The triumphant successes of ovariotomists, up to the present time, have been largely gained by the rapid improvements of the purely surgical details of the operation, with which Mr. Doran does not deal in this book; but a careful study of it will go far to clear up some of the difficulties met with, and diminish still further the cases which terminate fatally from operation or for want of operation; it also indicates lines along which future investigations should proceed.

Mr. Doran's work is based on a large experience, he has assisted at nearly 700 operations; and the parts removed by operation, and in fatal cases the postmortem examinations have supplied him with the materials on which his investigations have been made.

In the first chapter the theories held as to the origin of ovarian cysts are discussed. Mr. Doran believes that their source will be found to be in the large number of Graafian follicles which never arrive at maturity, but while undergoing retrograde changes, take on a morbid cystic action.

The structure of the common multilocular and glandular cysts is next described, and in the following chapter minute description of the cysts found in the broad ligaments is given, and the author here points out, that as many so-called Parovarian cysts do not originate in the parovarium, the term broad-ligament cyst is preferable.

He also points out the important fact that cysts originating from the vertical tubes of the parovarium and their extremities situated in the hilum of the ovary are often the seats of papillary growths, and that there is danger in tapping them, as after emptying the growths may suddenly increase with great rapidity and invade the peritoneum.

Papillomatous cysts of the ovary spring from the hilum, inside the broad ligament, are therefore sessile and difficult of removal, and the fluid contained in them is clear, not glairy.

"Papillomatous growths are very intolerant of operative interference, and as far as immediate results are concerned, it appears more dangerous to leave them behind than to leave sarcomatous deposits in the abdominal cavity."

Two chapters are devoted to the consideration of dermoid cysts and solid tumours of the ovary. Valuable information is also given on the rupture of cysts and twisting of the pedicle.

Then follows a very important chapter on morbid conditions of the kidney, associated with ovarian disease, a subject the importance of which is only too well recognised by operators, but about which there is much to be learnt.

The frequency of the contracted kidney, the insidiousness of its progress and the absence of symptoms lead to some of the greatest dangers of operations involving the prolonged exposure of the abdominal cavity.

On the other hand the presence of albuminuria and some dropsy do not necessarily contraindicate ovariotomy, and indeed these conditions are often relieved by the operations.

We heartily congratulate Mr. Doran on this result of his work, which has already received such high commendations from Sir Spencer Wells, in his recent address at Birmingham.

A Text-book of Human Physiology, with Special Reference to the Requirements of Practical Medicine. By Dr. L. LANDOIS. Translated from the fourth German Edition by WILLIAM STIRLING, M.D., Sc.D., Aberdeen. Vol. I. 8vo, pp. 514, with numerous Illustrations. London: Charles Griffin and Co. 1885.

A WELL-KNOWN clinical teacher used to say that the best text-book on medicine for students engaged in hospital work was Foster's *Physiology.* The lesson he meant thereby to teach has been well and widely learned in recent years, and the perpetual need of reference to the facts of normal physiology for the explanation and the treatment of morbid changes now hardly needs enforcing. The great text-book alluded to is, however, so weighty and so profound that it demands, as it deserves, careful and sometimes prolonged study to exhaust all the bearings of its teaching on the matter in hand. It is for continuous and patient study, not for reference. Professor Landois's work, if less philosophic and more dogmatic, has since its issue in 1880 found a welcome from many who have long left the schools, and have lost the leisure, if not the habit, for study. It is practical, and practitioners have seemed to find in it with more ease and in more concise form the information they sought. Four editions of the German work having been brought out in four years, Professor Stirling was justified in venturing an English edition, even in a field already so well occupied. We are so bold as to think that he will be gratified by the ready reception in England of his generally excellent translation. Much has been added by him, both in the text and in the figures, and almost everywhere the additions are a gain from an English point of view. The characteristics of the work are its clear arrangement both of the matter and of the type, its lucid and terse language, its lavish but never superfluous illustration, its sufficient histology of the organs and tissues given in immediate connexion with the account of their functions, and most important of all its constant application of the physiological data to clinical and pathological problems. In these latter sections we may have the germ of the text-book of the future on morbid physiology. The present volume deals with the blood and the circulation, respiration, digestion, absorption, animal heat, and general metabolism. The second volume is to appear early in this year, and no doubt it will be eagerly looked for by students of all ages.

The Alpine Winter Cure, with notes on Davos Platz, Wiesen, St. Moritz, and the Maloja. By A. T. Tucker Wise, M.D., L.R.C.P., M.R.C.S. London: Baillière, Tindall, and Cox. 1884.

A short time ago we gave a brief account of winter health-resorts, and mentioned the success which has attended the treatment of consumption in Swiss Alpine localities. Dr. Wise's work is intended to give an exact account of the curative properties of an Alpine climate, with its advantages and disadvantages; and a special description is given of the new resort, the Maloja. The patients who should not visit these health-resorts are those suffering from (1) diseases of the heart or large vessels; (2) tendency to articular rheumatism; (3) kidney diseases (during winter); (4) acute inflammation of throat or larynx; (5) some diseases of the bladder and prostate. Persons somewhat advanced in years should not visit the mountains unless the circulatory system is sound. The author gives a number of useful practical hints in regard to clothing and diet, and we heartily recommend the book both to patients who are thinking of visiting the Swiss health-resorts and to doctors who desire precise information regarding them.

Handbook of Midwifery for Midwives. Translated from the official Handbook of Midwifery for Prussian Midwives. By J. E. Burton, M.R.C.S., L.R.C.P. Lond., Surgeon to the Hospital for Women, Liverpool. Fcp. 8vo, pp. 300. Second edition. London: J. and A. Churchill. 1884.

This volume, though small, and for the most part clearly written, offers so high a standard of instruction that it will, we fear, be considerably above the appreciation of any but the highest class of midwives in this country, and must in fact be utterly unintelligible to the large body of women who are allowed to practise as midwives amongst the poorer classes in our towns and country districts. A woman who desires to reach the standard of knowledge here indicated must have received a good general education, a good preliminary training in ordinary nursing, and a thorough training not only in the labour-ward and by the bedside, but under the demonstrations of a competent instructor. Such an education is, we regret to say, not afforded to medical students even at the best institutions; and in the end the woman who had received it would be fitted to take her place beside or before the best of our modern highly-trained hospital nurses.

We look anxiously forward to the general recognition of the fact that a midwife should in the first place be taught nursing, and the value of attention to details especially of cleanliness and the use of antiseptics. How else are we to escape the calamities which so constantly occur as the result of protracted labour, hæmorrhage, and septic poisoning?

The translator has evidently had great difficulties to deal with in endeavouring to transpose technical terms into homely language, and he has in some cases succeeded. Whilst the almost entire absence of illustrations must be an additional drawback to its use by midwives, we would recommend the book to the notice of students and junior practitioners, who will find in it many details of nursing and general information which are of great value and not elsewhere to be obtained.

Fat and Blood: an Essay on the Treatment of certain forms of Neurasthenia and Hysteria. By S. Weir Mitchell, M.D. Philadelphia: J. B. Lippincott and Co. 1884.

Dr. Weir Mitchell's views and method of treatment are becoming widely known and appreciated, and it is perhaps time that those who employ a method producing such great results in suitable cases should receive the warning with which Dr. Mitchell begins and ends this book: "I am now more fearful that it will be misused, or used where it is not needed, than that it will not be used." Practitioners will find in this volume information as to cases which are suitable, and the details of their treatment by seclusion, rest, massage, electricity, and diet;

the least important of these, according to Dr. Mitchell, being electricity. There is no doubt as to the good results obtained in properly selected cases, but we should like to hear more of the unsuccessful cases, the difficulties of recording which appear to be over-estimated. We should expect to find that, as Dr. Playfair has stated, it is the half-bad cases that do not succeed. It is worthy of note that Dr. Mitchell excludes all cases complicated by organic disease and by melancholia from this form of treatment.

The Year-Book of Treatment for 1884. A Critical Review for Practitioners of Medicine and Surgery. Cr. 8vo, pp. 316. Illustrated. London: Cassell and Co.

THE object of this book is "to present to the Practitioner not only a complete account of all the more important advances made in the treatment of disease, but to furnish also a review of the same by competent authorities." Of the competency of the authorities chosen there can be no doubt, the list of twenty-three contributors including some of the best-known and best-trusted names in medicine and surgery. A single department or group of diseases has been assigned to each, and though the different authors have somewhat different views as to the desirable proportion of criticism to simple recital of published statements, there is more of uniformity in the high level of selection and of appraisement than might be looked for in a somewhat new venture. Month by month we attempt in this journal to lay before our readers the most suggestive advances in treatment set forth in the medical press of the world, but our monthly space is far from adequate to contain all that deserves mention. This year-book comes as a welcome completion, and every practitioner should, in his own interest and that of his patients, find time to consult it. With *Neale's Digest* for the literature of the past, and the year-books which we hope to see annually appearing for the literature of the present, it should be out of any one's power to excuse antiquated or non-scientific practice on the ground of lack of time to keep abreast of advancing knowledge.

Clinic of the Month.

Bilateral Herpes Zoster.—Dr. J. Magee Finny writes: The following case, having recently occurred in the extern department of the hospital, is worthy of record, on account of the rarity of herpes zoster attacking both sides at the same time. Mrs. D., aged 40, an otherwise healthy well-to-do woman, consulted me on September 29th, 1884, for what she feared was erysipelas of her neck and ear, and for a most severe headache, which had lasted for four days, and had deprived her of sleep. She stated that the headache was all over her head, but particularly on the right side, and that at the time of its first appearance she noticed a number of small red spots on the left side of her neck and shoulder, that these spots had a burning "sore" pain, that they had increased in size and number since the day before her visit, and that also her right ear was very sore, while a number of painful spots had broken out through her hair on the back of the scalp on the right side. On inspection, the characteristic erythematous patches of herpes zoster, studded with vesicles of various sizes, were at once recognised; and it was evident that both sides were simultaneously affected, although at a somewhat different level. On the left side, the erythematous patches were most numerous; they followed the distribution of the descending sensory nerves of the cervical plexus, with the exception of the suprasternal division, and were limited to the upper part of the deltoid and pectoral muscles; a large patch occupied the posterior superior triangle of the neck, and one or two small ones were over the sterno-mastoid. The eruption on this side would correspond to von Bärensprung's variety, *Z. cervico-subclavicularis.* On the right side, the ascending branches of the second and third cervical nerves were those engaged (*Nervus occipito-collaris*), and no patches were visible below the level of the thyroid body, though a large cluster occupied the anterior triangle of the neck as far forwards as that body, corresponding to the junction and cutaneous distribution of the superficialis colli and inframaxillary branch of the facial nerve. Another patch was on the lower jaw, and a third was situated near the mastoid, over the origin of the plexus. The whole of the external ear was red and swollen, and thickly studded with very minute vesicles, the swelling extending a short way into the meatus auditorius. The scalp on the same side, and strictly limited to that side, as far forward as the mid-parietal region, was the seat of a number of scattered pimples and vesicles (the redness usual in herpes elsewhere being absent), which followed closely the course of the greater and lesser occipital nerves. When the patient was seen a few days subsequently, the majority of the bullæ had been arrested or had aborted, some few had become confluent and turbid, and those in the scalp were larger, and most distinctly bullous. The patient's general health had been fairly restored, as she was able to sleep, and the headache and the burning stinging pain in the affected parts had greatly abated. No new spots had appeared, but on the right side, above the clavicle, where the skin was free from all rash, very considerable soreness was complained of. The treatment consisted of quinine and iron, in combination with sulphate of magnesia, and the local application of flexible collodion to the neck, and weak carbolic ointment to the scalp. The patient soon recovered.

REMARKS.—The foregoing illustrates at once the characteristic features of regular herpes zoster and certain unusual peculiarities. To the first belong (*a*) the sudden occurrence of the eruption, (*b*) its course along the cutaneous distribution of the sensory nerves, (*c*) the neuralgic phenomena which preceded and accompanied its appearance, and (*d*) the acute course of the complaint. To the latter may be referred (1) the occurrence of herpes of the scalp, and (2) the coexistence of the disease at different sides of the neck. Herpes zoster, or, as I consider it might be termed, with a nearer approach to an accurate nomenclature, *neurotic herpes*, may be found in almost any part of the body. It has, however, its predilections for certain parts, if one may be permitted so to speak of a disease. The most favourite sites are in the course of the intercostal nerves and the lumbo-sacral plexus; next in order comes the brachial plexus, the descending branches of the cervical, and the frontal or facial branches of the fifth nerve. Among the most rare are the occipital nerve and the nerves of the forearms and legs. The chief interest of the foregoing case is, however, centred in the fact that the herpes attacked both sides at the same time. This is one of the rarest manifestations of a not uncommon affection; and, indeed, in many of the most recent text-books, the possibility of zoster being bilateral, instead of on one side only, is not even mentioned. "Unilateral herpes" is the name by which it is sometimes known; and the recognition of the almost invariable rule of its attacking but one side of the trunk, extremities, or face, is of great diagnostic value in contrasting it with catarrhal or simple herpes, which attacks one or both sides indifferently. In the comparatively few instances on record of bilateral herpes zoster, the eruption, as in the above case, is not on exactly the same level; but the cutaneous nerves attacked on one side are on a higher or lower level than those on the other side. (*Brit. Medical Journal*, Jan. 10, 1885.)

Adenoma of the Liver in an Infant.—A remarkable instance of this rare disease is found in the yearly report of the St. Joseph Children's Hospital in Vienna. A female child, twenty months old, had suffered for three months with loss of appetite, emaciation, and swelling of the abdomen. The right side of the abdomen was occupied by a tumour reaching from the sixth rib to the iliac fossa, and on a line with the umbilicus from the linea alba to the vertebral column. Palpation showed elevations over the surface of the liver from the size of a horse-chestnut to that of a child's fist. They appeared soft when pressed against the resilient liver. There was also enlargement of the spleen, and the urine showed albumen. At the autopsy the liver was found to weigh over three pounds. Its surface was covered with knobby tumours of various sizes. Section showed the liver substance to be entirely replaced, with exception of its periphery, by a soft yellow mass sprinkled with numerous hæmorrhagic points. It was separated from the resistant liver tissue by a capsule. Connective tissue septa ran through the mass, indicating that it had been formed from a number of confluent tumours. There were, besides this large mass, tumours from the size of a pea to that of a walnut scattered over the periphery. Some were so soft that they almost fluctuated. Careful microscopic examination showed the growth to be an atypical adenoma. (*Wiener medizinische Wochenschrift*, No. 43, 1884.)

Numbness of the Upper Extremities.—Dr. Sinkler says that the symptoms are regular and constant in their general characters; the patients are usually women, and at the change of life. The numbness generally began in one or both hands, and gradually extended up the arms; it was usually most marked in the morning before getting up. There was but little loss of feeling to touch, or pain; the numb member was weak, but there was no paralysis, and the weakness was transient; the patients sometimes thought the hands were swollen when the numbness was most marked. The condition was only occasionally associated with rheumatic affections; it seemed sometimes due to over-use of the limb first affected; its duration varied from a few months to several years. The ulnar and median distributions were most frequently affected, and tenderness over the ulnar or median nerve was frequently observed. Many patients were in good general health, but some were anæmic or over-worked. Dr. Weir Mitchell, referring to cases in which numbness came on during sleep, remarks that in such cases the numbness was frequently hemiplegic in character, and alludes to the fact that some persons who have got pretty well of a hemiplegia of organic origin, are liable to wake out of sleep with numbness and lessened power of the side once paralysed. Dr. J. J. Putnam has published a paper, based on the notes of thirty-one cases. His treatment comprised galvanism, phosphorus, strychnine, potassium bromide, &c.; and he seems to have found phosphorus of more value than any other single means used. Dr. Putnam states that he has lately found lead in the urine of one of these patients, and advises that it should be sought for in all such cases. Dr. Ormerod ascribes the affection to vascular spasm, and observed that bromide of potassium afforded marked relief in several of his cases. Dr. Sinkler inclines to the belief that in these cases there is either hyperæmia of the nerve-trunk, or (as when the numbness is bilateral in its distribution) that there is a congestion of the cervical enlargement of the spinal cord. This view is strengthened by the occurrence of the numbness at night, for the supine posture favours a hypostatic congestion of the cord; and he has seen patients in whom the numbness came on if they lay down and fell asleep even for a short time in the day. Women, at the climacteric, are more prone to hyperæmias and congestion, and they are the more frequent subjects of this form of numbness. Further, improvement usually followed the administration of remedies which are believed to diminish the blood supply of the nervous centres. The prognosis in middle-aged women is not good as regards permanent relief, though the numbness can generally be much benefited or stopped for a time. When the trouble has been induced by over-work of the part, permanent cure is almost certain, if the cause can be removed. In Dr. Sinkler's hands, ergot has proved the most useful drug. Massage and spinal galvanism are useful adjuvants, as are all means which improve the general health. Bromide of potassium sometimes does good, and one of his patients was much benefited by sinapisms over the spine. In most cases it was found advantageous to give strychnine for some time after the disappearance of the numbness. (*New York Medical Journal,* July 26, 1884; *Med. Times.*)

Agraphia.—At least as far back as 1856 (M. Marcé: *Mémoires de la Société de biologie de Paris,* 1856), it was pointed out that in cerebral injuries the faculty of writing might be lost, just as the faculty of speech is lost, without any loss of muscular power or mental competence, that there was in fact a condition of agraphia or "aphasia" of the hand. M. Pitres devotes an interesting essay to its discussion. The analysis of the faculty of memory as applied to language, which disease enables us to make, is in three divisions, viz. of sights, of sounds, and of muscular movements. Each of these may be abolished, leaving the other two intact. First, if memory of sight alone be lost, a man can hear and write and speak, but cannot read what he has written. He may, however, by an ingenious artifice gain knowledge of what he has written by using his surviving memory of muscular movements, if he makes his hand trace out the forms of the letters lying before him, which are meaningless to his eye. By his recollection of the movements he recovers knowledge of the word written by them. It seems likely that there may be loss of parts only of this visual memory; that he may forget the meaning of printed letters and remember handwriting (Grasset); or forget words and remember musical notes (Lasègue). Secondly, if the memory of sounds be lost, a man may speak and read and write and hear words, but not understand their meaning when he hears them (Girandeau, &c.). In the third place, if memory of muscular movements alone is lost we have pure motor agraphia; the man can speak, and hear, and understand and move his fingers easily, but he cannot write, for he cannot recollect the necessary associated movements. Of a case of this kind M. Pitres gives very full details. The man, in July 1882, had sudden right hemiplegia with aphasia, and improved rapidly under energetic antisyphilitic treatment. His aphasia disappeared completely, to begin with, and he recovered the use of his limbs slowly and nearly entirely. In February 1884, eighteen months after his first apoplectic attack, he came under the care of M. Pitres at Bordeaux, and his symptoms were very carefully observed. The left leg and left arm were stronger than the right leg and right arm, in the proportion of three to two and seven to six respectively. There was ankle clonus on the right side, and increased deep reflex in both arm and leg. The right side was slightly colder; there were chilblains on the right hand but not on the left. With the right hand he slightly under-estimated weights, and there was a slight loss of muscular sense in some particulars, *e.g.* when blindfolded and told to hold out both hands on the same level he always held the right hand a few inches higher than the left; however, he could touch his nose accurately and quickly with his right hand, and if his hand was held and moved in the air after the fashion necessary to write a word he could read the word easily from the movement. There was no relic of aphasia; he could read handwriting and print quite normally. The agraphia of the right hand was what annoyed him. He had learnt to write with the left hand, but not a letter could he form with the right, except when he painfully copied what he had already written with the left, with an appearance of tracing out unfamiliar forms with constant comparison with the pattern. The awakening of muscular memories by writing a word with the left hand was not enough to enable him to write it with the right; it was necessary he should have it before his eyes to copy. If he was told to write a printed word lying before him he formed his letters like those of the print, and could not transcribe it in cursive characters. Nevertheless, if told to draw a triangle, or octagon, or other geometrical figure, or even a human face, without any pattern, he could do it readily with his right hand. And in spite of diligent attempts he made no progress in writing in the next eight months. Such symptoms constitute pure motor agraphia or graphoplegia, as it may be called in correspondence with the logoplegia of aphasics. Its cerebral point of origin M. Pitres is inclined to put, with M. Charcot, in the lower part of the second frontal convolution, in front of Broca's centre. Its extent is so small that an injury very rarely affects it alone, and is very apt to include the aphasic centre at the same time, so that the symptoms become obscured. (*Revue de Médecine*, Nov., 1884.)

Jacksonian Epilepsy.—An interesting contribution to the pathology of a typical case of Jacksonian epilepsy is given by Dr. William Osler. The case was that of a girl who died at the age of fifteen years and nine months, having manifested the epileptic phenomena for more than fourteen years. She had been healthy up to the age of sixteen months, when she had a fall on to her head, though for five months after this no symptoms referable to the brain were noticed. From that date she became liable to attacks of spasms lasting for about seven months, and then disappearing for as long an interval; on one occasion she was free from them for a year. The spasms always began in the left hand, and after a time the leg became affected, the spasm beginning in the toes, the face being affected last. There was never any loss of consciousness, and in the intervals between the spasms the patient was quite well. Thus it is said that if a spasm happened to seize her whilst she was at dinner, she would get a pillow and place it on the floor, and then lie down until the spasm was over, when she would return to her dinner. When she was about eight years old the left leg became weaker and the foot began to turn in, and from that time contracture remained, but the arm was never in the least degree stiff. From the time that she was eleven years old the fits became more frequent, and she was at one time time unconscious for six weeks. For the last ten months of her life she was free from spasms. Her intellectual faculties were unimpaired throughout. Death took place during a paroxysm of convulsions. On examination of the brain a small firm glioma was found in the white substance immediately below the cortex, but hardly if at all invading the grey matter, at the upper part of the ascending frontal convolution. The case affords, as Dr. Osler points out, confirmation of the view derived from Ferrier's experiments as to the seat of the leg centre, and is quite in harmony with the pathological experiences of MM. Charcot and Pitres on this point. Dr. Osler was led to infer that the growth had always been small, and in the earlier stages of its development, though causing irritation enough to set up the convulsions, had not involved the white fibres coming from the leg centre to such an extent as to produce the permanent contracture. (*Amer. Journ. Med. Sciences*, Jan. 1885.)

Chylous Ascites.—Milky effusion into the abdominal cavity is or rare occurrence, especially in children. A well-marked case of this kind was observed recently by Dr. Letulle. The patient was a boy, aged eight years, who some two years before coming under observation had a first attack of articular rheumatism. A second seizure occurred about a year afterward. Both times the heart was implicated in the rheumatic affection. Œdema, ascites, and dyspnœa soon developed. Intense pains in the lumbar region came on. Anorexia, vomiting, insomnia, and restlessness were added to his sufferings. It was decided to remove some of the fluid from the boy's belly, and on puncture about two quarts of a milky liquid escaped. Microscopical examination showed it to be largely composed of emulsified fat. In commenting upon this and similar cases, the author concludes that, in all cases of chylous ascites in which an autopsy was obtained, the chief lesion consisted in chronic peritonitis. This was due either to tuberculosis or cancer, or to simple sero-fibrinous inflammation. A chronic inflammatory element was almost constantly present, and must be held largely responsible for the occurrence of chylous ascites. The same applies to chylous pleurisy. A granulo-fatty degeneration of the products of inflammation, namely pus and fibrin, accounts for the milky appearance of the effusion. In the serum of the latter the oily globules and granules are suspended, forming a real emulsion. (*Revue de Médecine*, No. 9, 1884.)

Ear-affections in Gonorrhœal Rheumatism.—Hermet, noting the rarity of this complication, discusses at length the condition as it existed in a case in which the clinical symptoms were carefully observed. The rheumatism affected various joints throughout the body, and it was noticed that amelioration of the general symptoms was alternated by loss of hearing, and *vice* *versâ* improvement in the auditory function was followed by return of the rheumatism elsewhere. The pain in the ears, during the attacks of deafness, was intense, all sounds, especially those of a high pitch, causing extreme pain. Examination of the ears revealed (in the left) a calcareous plate situated at the posterior border of the tympanic membrane, which was probably due to the effects of a former purulent otitis, which had followed a previous attack of rheumatism. The right ear was normal. Reviewing the anatomical relations of the ossicles and the tympanic membrane, Hermet logically concluded that the impairment of hearing was due to the extension of the rheumatic arthritis to the articulations of the ossicles. Accordingly, when the tympanic membrane, vibrating under the impulse of the sonorous waves, communicated motion to the chain of bones, pain was experienced, inasmuch as the attachment of the handle of the malleus to the membrana tympani necessitates motion in every articulation of the chain. The fact that during silence there was entire absence of pain strongly confirmed the conclusions reached, and the observed alternation of the auditory and general manifestation of the disease left but little doubt of the correctness of the diagnosis—gonorrhœal rheumatism of the tympanic bones. (*L'Union Médicale*, Dec. 25, 1884.)

White of Egg in Obstinate Diarrhœa.—Celli has recently called attention to the curative properties of the albumen of hens' eggs in severe diarrhœal affections. In a discussion before a medical society at Rome he advocated its use, and related two cases of chronic enteritis and diarrhœa, which, having resisted all treatment, speedily made complete recoveries under the use of egg-albumen. The same diet is strongly recommended in the diarrhœa accompanying febrile cachexia, and in that of phthisis. In two cases of diarrhœa dependent upon tertiary syphilis it was found of no avail. On post-mortem examination diffuse amyloid degeneration of the arterioles of the villi was found in these cases. The mode of administration is as follows: The whites of eight or ten eggs are beaten up and made into an emulsion with a pint of water. This is to be taken in divided quantities during the day. More may be given if desired. The insipid taste can be improved with lemon, anise, or sugar. In case of colic a few drops of tincture of opium may be added. (*Allgemeine medicinische Central-Zeitung*, Oct. 8, 1884.)

Crimson Sweat.—Dr. L. M. Petrone relates the case of a young man of healthy antecedents, who stated that he had observed for several months an increased secretion of sweat about the axilla and pubes, and this secretion was of a pungent odour and a red colour. Microscopical examination of the hairs in these regions showed vast quantities of round red-coloured micrococci. They were seen along the entire length of the hair, extending even into the follicle. A few drops of perspiration taken from the axilla and placed under the microscope showed the same micrococci. Red perspiration loses its colour gradually in absolute alcohol, but more quickly in a solution of potash. The patient was relieved by using a five per cent. solution of caustic potash. Chloroform, ether, and carbolic acid were tried without success. From the facts in this case, and from a study of the cases recorded by other observers, Dr. Petrone concludes that the phenomenon of red perspiration is probably due to a dermatomycosis localised principally in the hairy regions of the body, the parasite of which is a red or at least chromatogenous micrococcus. The disease does not appear to be contagious. (*Lo Sperimentale*, Nov. 1884.)

Abscess of the Spleen Cured by Aspiration.—A case is recorded by Parzewski in which a man, after taking a draught of very cold water, was seized with violent pains in the left side. He stated he had been attacked in a similar way about five years before. In two weeks from this time the patient became much emaciated, and a fluctuating swelling appeared in the region of the spleen, stretching forward towards the ensiform cartilage. There were also symptoms of a pleurisy on the same side. The side was punctured with a morphia syringe, and a serous pleurisy was discovered, with an abscess of the spleen, which abscess was aspirated, and found to contain a dirty red fluid consisting of pus and many broken-down blood corpuscles. In the course of five weeks the aspiration was twice repeated, about a pound and a half of fluid being evacuated on each occasion. Five weeks after the first aspiration the patient left the hospital well, the spleen being but slightly enlarged. (*Central. f. Chirurgie*, 1884, p. 126.)

Extension of Mammary Carcinoma after Erysipelas.—It is only a few months ago that Janicke and Weisser published an account of some cases of mammary cancer, in which the question was raised of the advisability of inoculation with erysipelas in those cases which were too far advanced for removal, inasmuch as it would seem that such a form of inflammation was detrimental to the progress of the cancer. The following case (reported by Neelsen) is therefore of unusual interest, as showing that erysipelas, in some cases at least, tends rather to hasten death than to avert it. A very stout woman aged forty-one was admitted into hospital with both breasts affected with cancer. It was not deemed advisable in such a subject to remove both breasts, and accordingly the left one was subjected to operation, and the axilla cleared out.

Thirty days after the operation, which did not heal without suppuration, rigors and rise of temperature occurred, and an attack of erysipelas followed. It proved to be very severe, and was accompanied by inflammation of the whole chest wall, suppuration in the cellular tissue, and a serous pleurisy. At the end of the attack, some fifteen days after its commencement, the right breast appeared to have shrivelled somewhat. For between three and four weeks the woman continued to improve, when another attack supervened, ushered in like the first, and a week later she died. At the post-mortem, which was performed ten hours after death, the right breast was found, like the left, to be the seat of an alveolar carcinoma. The greater part of this was undergoing degenerative changes, and could scarcely be at all stained by anilin and hæmatoxylin; but a second series of cells were found occupying principally the seat of the connective tissue, and reinvading the carcinoma; these cells greedily absorbed the staining fluids, and though many of them were merely round infiltration cells, a considerable number could be found which betrayed their epithelial origin by their irregular angular shape, and well-marked nuclei. It would seem as though the second attack of erysipelas only served to fan the flame of the partially-killed cancer cells, instead of completing the work of disintegration which the first attack had set on foot. (*Central. f. Chirurgie*, 1884, p. 729.)

Extracts from British and Foreign Journals.

Gouty Diseases of the Eye.—In the "Bowman Lecture" delivered at the Ophthalmological Society by Mr. Jonathan Hutchinson, on the "Relation of certain Diseases of the Eye to Gout," the author commences his lecture by stating that he wishes to keep a clear distinction between gout and rheumatism. By gout is meant all states of health which are, whether directly or remotely, connected with the accumulation of urate of soda in the blood, as the result of overfeeding or defective assimilation. The first condition with reference to diseases of the eye to which the author alludes is that termed by him the "hot eye." Usually only one eye is affected; the conjunctiva becomes red the eyeball feels hot, and pricks as if sand were in it. This condition is met with in persons who inherit gout, who do not have the acute paroxysmal attack, but only forms of what the author terms *quiet gout*, and more often called suppressed, or, better, undeclared gout. There is little or no evidence, says the author, as to the deposit of urate of soda in any of the structures of the eye. The nearest approach to proof of gouty deposit has been made probably in the case of what are known as the transverse calcareous bands in the cornea. Mr. Nettleship has recently collected much information respecting this disease, and the present state of our knowledge on this subject may be summed up by saying that no one has yet proved that the salt deposited is that of gout. Many forms of iritis are, however, of arthritic origin. In other words, they occur to those who are liable to attacks of inflammation of joints, and the inflammations of the eye occur under conditions similar to those which excite the inflammations of the joint. The point which the author considers is, whether the causes which produce the attacks of iritis belong to gout or to rheumatism; whether they sometimes belong to the one, and sometimes to the other; or lastly, whether they are not, in some cases, of a hybrid or mixed nature. The author draws up his conclusions on this subject by stating that, although in many individual cases of arthritic iritis there may be no proof of liability to gout in either the patient or his relatives, yet the tendency of the evidence in general is in favour of the conclusion that, when iritis occurs, there is in reality some gouty complication. The more purely and definitely is the case one of rheumatism, the less the probability that iritis will happen. The author then goes on to prove that there is a very peculiar form of destructive iritis, occurring for the most part in young persons, which stands in all cases in direct relation with the inheritance of a gouty constitution. It does not occur to those who themselves suffer from attacks of gout, but to their descendants. There is also a peculiar form of chronic inflammation of certain parts of the eyeball, known as relapsing cyclitis. It is a cyclo-kerato-iritis, involving the ciliary region of the sclerotic, the adjacent part of the cornea, and the iris. It usually begins in one eye and affects the other after a long interval, and the last one usually suffers more severely than the other. There is no treatment for it short of complete change of climate, but there is not always a history of gout in these cases. In speaking of gouty neuritis of the optic nerve, the question arises, whether there are any cases of inflammation of the optic nerve, or of any of the motor nerve-trunks of the eyeballs, the direct cause of which is the existence of a gouty constitution. The author can bring very little evidence in answer to this important question, but is of opinion that gout has a great tendency to the production of glaucoma. Another important affection of the eye is retinitis hæmorrhagica, which is rarely seen except in those who are themselves gouty. It is a disease of middle life, and seldom happens in both eyes at once. The lecture terminates with a few remarks on "the proofs of gout." In the case of humoral or acquired gout, there ought to be the history of one or more definite attacks of joint-inflammation, usually of an acute character. As regards the inherited form, it is necessary to enquire into the family history, and to ascertain if the fathers or grandfathers are known to have definitely suffered. If even uncles, aunts, brothers or sisters, or cousins have suffered from true gout in early life, the belief that a family taint exists becomes very probable. Evidence must be sifted carefully, and enquiry made, not only of the patient himself, but also of other members of his family. (*Lond. Medical Record*, Jan. 1885.)

Pruritus Ani.—In the *Brit. Med. Journ.*, Nov. 1884, p. 1110, a correspondent writes that he has found great use from the following mode of treatment in cases of pruritus ani: The patient having sponged himself well with warm water should syringe some up the rectum; then soaking a pledget of cotton wool in the following lotion, he should pass it well up the anus, leaving it there till he next defecates, when it must be renewed.

℞ Acidi carbol. gr. xx.; tincturæ opii, ℥iv.; acidi hydrocyan. dil. ʒij.; glycerini, ʒiv.; aquam ad, ℥vj. (*Lond. Medical Record*, Jan. 1885.)

Prognosis in Lateral Curvature.—Pravaz considers the patient's general condition of great importance in the prognosis of lateral curvature. Chlorosis and imperfect nutrition are unfavourable to the reestablishment of the figure. In general, recovery of the figure is more to be expected in younger than in older patients, but the writer wishes to warn against the prevalent idea that patients will grow out of a curve of the spine. If the distortion is manifest, and does not disappear in the horizontal position, careful treatment is necessary. The prognosis in curvature following phthisis is unfavourable, and distortions due to disturbances of muscular action are often very difficult to treat, and rickety distortions are more unfavourable for treatment than those due to a loss of flexibility of the spine in children at the time of the second dentition or puberty. Curvatures submitted to treatment at an early stage, even when quite pronounced, may become corrected, provided the patient's general condition is good, the prognosis depending in a large measure upon the amount of rotation of the vertebræ present rather than on the amount of the curve. Curvatures in the lumbar region are less favourable than those in the dorsal region, and curvatures with a long radius are more readily straightened than those with a short radius. (*Bulletin de la Soc. de Chirurgie de Paris*, x. 177.)

The Dyspnœa of Bright's Disease.—A communication on the varieties of dyspnœa met with in Bright's disease, by Dr. Howard of the McGill University, illustrates the following points: (1) That marked dyspnœa may occur in Bright's disease not due to gross lesions in the lungs, pleura, or heart—such as inflammation or œdema of the lungs, hydrothorax, or pleurisy with effusion, endo- or peri-carditis, or valvular disease. (2) That it may be a continuous dyspnœa, or of paroxysmal character, resembling ordinary spasmodic asthma; and that these types may occur in the same case, although, in my experience, the continued variety is more frequent than the asthmatic. (3) That these forms of dyspnœa may occur as the prominent symptoms of renal disease, and their origin may escape recognition if the urine be not carefully examined, as well as the heart and pulse. (4) That Cheyne-Stokes respiration is often a symptom of Bright's disease, and that it obtains in both acute parenchymatous and in chronic interstitial nephritis. (5) That while usually an evidence that the fatal issue is near at hand, it may occur in a chronic form, and may occur for weeks, perhaps even for years. (6) That these several forms of dyspnœa just mentioned are very probably due to that defective renal elimination called uræmia. (7) That in the acute forms of Bright's disease, serious or fatal dyspnœa sometimes, but rarely, occurs in connexion with effusion into the submucous membrane of the larynx (œdema glottidis). (*Canada Medical and Surgical Journal*, Nov. 1884.)

Antidote for Resorcin.—It having been remarked that in resorcin poisoning the arteries were nearly empty while the veins were engorged, Dr. Justus Andeer proposed the use of hot baths in order to deplete the venous system. He found, however, on experiment, that warm baths rather increased the severity of the symptoms caused by the resorcin poisoning. After casting about in several directions for an antidote, he finally discovered that the very best was good red wine—either Bordeaux or Burgundy. This acted equally well in slight and severe cases of poisoning from this substance. The author did not approve of the practice of giving an emetic, since by the time the dangerous symptoms had appeared the drug taken into the stomach had been entirely absorbed. If, however, there were any reason to suppose that such were not the case, the best emetic to employ was apomorphia given hypodermically. But red wine, he claims, is the true and certain antidote to resorcin. (*Wiener medizinische Presse*, No. 38, 1884; *N.Y. Med. Record.*)

Varices of the Œsophagus.—M. Hans Bendz has recently called attention to varices of the œsophagus caused by circulatory troubles of the portal system, especially in cirrhosis of the liver. After a rapid introduction of his subject, he gives a detailed history of the case which called out his article. The case in question was that of a man, aged fifty-five, who, after about a year, showed evident symptoms of cirrhosis of the liver with a considerable degree of ascites, and died suddenly from profuse hæmatemesis. The stomach and small intestine contained a considerable quantity of blood at the autopsy; the mucous membrane was of normal condition, and was diffusely red, sometimes a clear red, sometimes deep. The liver was cirrhotic. The œsophagus showed in its inferior portion tortuous, dilated, varicose submucous veins. At the summit of a varix was encountered a longitudinal opening with thin and pale edges. The author emphasises the fact that the opening was only discovered by the swelling of one of the trunks. There is no doubt but that all the blood which escaped from the mouth, and which was found in the intestinal canal, escaped from this opening. Bendz mentions a case observed by Odenius, but not yet published. In this case also there was cirrhosis of the liver. with considerable ascites. On the day on which the patient died a considerable quantity of bloody fluid escaped from the mouth, and at the autopsy a bloody liquid was found in the stomach and small intestine. The mucous membrane was neither infiltrated with blood nor tumefied, but was in a normal state. The veins of the lower portion of the œsophagus were distinctly dilated. Bendz shows that, as in his case, the hæmorrhage came from the œsophageal veins, and believes that such an opening as he has described may be easily overlooked at the autopsy unless great care be exercised. In the eighth case (nineteen were collected) observed by Bendz the varices were similar to those in the first case, but there was no hæmorrhage and the circulatory disturbance was not so marked. The author thinks that this disturbance was due to the fact that the patient's respiration had been of the abdominal type for several years, thus subjecting the liver to a pressure which interfered with the free passage of the blood through the portal vein. In five of the cases collected the circulatory disturbances were distinct and important, and the hæmorrhages considerable and fatal. From a consideration of these cases Bendz passed to a consideration of the relations and importance of varices of the œsophagus. Though they were recognised many years ago, it is only in the last ten years that any importance has been attached to them; which is explained by the fact that it is only within that time that the bearings of portal disturbance on the general circulation have been more fully recognised. Bendz draws a marked distinction between true varices of the œsophagus, varices pertaining almost exclusively to the lower portion of the œsophagus, and the phlebectases often encountered in persons of advanced age, which are found all along the canal, though principally in the upper portion. With the latter he does not concern himself in this paper. The origin of the first is clear; they are formed just as other vascular dilatations in other parts of the body. Bendz severely criticises the interpretation given by Neelsen, of the origin of varices of the portal vein in general. Neelsen has taken no account of the fact that in all the cases cited by him the varices occupy the same part of the portal system. Nor can Bendz indorse the theory of Chautemps, referred to by Dussausay. From Zenker's statistics it would seem that true varices of the œsophagus, even in cases of cirrhosis of the liver, are rare. As regards the anatomy of these varices, the question arises: Does the œsophageal circulation belong to the portal system? Dussausay, relying on the facts in a case examined by him, presumes that most of the œsophageal veins belong to the portal system. Bendz, on the contrary, concludes from the fact that Fürst has examined twelve cases without finding such connexions, that it is only in exceptional cases that the œsophagus furnishes a greater or less amount of blood to the portal vein. These exceptional cases, however, are of great importance in the formation of varices of the œsophagus. If, in a parallel case, a trouble of the portal circulation is brought about, there are more open and spacious ways for a supplementary circulation, and varices may be more easily formed than in ordinary cases, in which the communication is made by the submucous veins of the cardia alone. From the situation of the varices in some of these cases, Bendz concludes that they are due to an abnormal distribution of the veins. The local sequelæ of varices of the œsophagus are dilatation of the canal, causing dysphagia, and erosions of the mucous membrane covering the principal vessels. Their general importance is principally due to the fact that they may cause hæmorrhages by rupture or by ulceration. On the one hand they are of such a nature as to render good service by furnishing a supplementary circulation, and thus preventing ascites. On the other hand, this may render the diagnosis very difficult, especially if the cutaneous veins are not dilated at the same time. From what was found in the first two cases, Bendz does not agree with Dussausay in thinking that the development of varices of the œsophagus, in cases of cirrhosis of the liver, will always prevent ascites. (*Nordiskt Medicinskt Arkiv*, Bd. xvi. Hft. 9; *Amer. Journ. Med. Sciences.*)

Gonorrhœal Disease of the Uterine Appendages.—Sänger, of Leipzig, read a paper on this subject before the Society of German Naturalists and Physicians, in Magdeburg. His opinion is that gonorrhœa in the female, and the affections of the uterine appendages connected with it, have not yet received the attention due to them. Gonorrhœa furnishes a far higher percentage of severe chronic affections of the pelvic organs than puerperal fever, and a far higher percentage of severe incurable cases than syphilis. The frequency of gonorrhœal affections is so great that about one-ninth of all gynæcological cases, or even more, is primarily caused by it. As regards the severity of the forms, it depends very much upon the coincident affections of the tubes and ovaries, and of the pelvic peritoneum. The principal centre is to be found in the tubes; with the exceptions of simple catarrh, and of hydro- and hæmato-salpinx, the severe forms of tubal disease are only of an infectious nature; and in this may be reckoned septic salpingitis, which may be either puerperal or non-puerperal; in each case it extends from the vagina, cervix, or uterus. There are, furthermore, a tuberculous, a syphilitic (Bouchard Lépine), and an actinomycotic (Zemann) salpingitis; but the gonorrhœal is unquestionably the most frequent form. There is also a mixed form, a puerpero-gonorrhœal salpingitis. After parturition or an abortion, the results of a recent or an old gonorrhœa are seen in a sudden attack of salpingitis. As has already been stated, gonorrhœal salpingitis, giving rise to an acute or chronic inflammation, or to pyosalpinx, is a chief cause of severe disease of the uterine appendages and the pelvic peritoneum. Sänger cannot accept Noeggerath's division of perimetritis into an acute, relapsing, and chronic form; he classifies gonorrhœal affections as urethral, vesical, and renal: those of the vulva and vulval glands; vaginal, and uterine (gonorrhœal catarrh); and of the uterine appendages, which he again classifies as gonorrhœal disease of the tubes (salpingitis, pyosalpinx, peri-salpingitis; of the ovaries (perioöphoritis, oöphoritis, and abscess of the ovary); of the broad ligaments (inflammation of the cellular tissue, parametritis, and abscess formations). These forms of disease may be either unilateral or bilateral, and there may also be a co-existing perimetritis; they may result in pelvic peritonitis or in diffuse perimetritis. They may be either acute or chronic. As regards the diagnosis of gonorrhœal diseases in women, it seems that since the discovery of the gonococcus of Neisser, this should determine the diagnosis in doubtful cases; although the latest researches of Bumm seem to render this somewhat uncertain. It seems, however, that there can scarcely be a doubt as to the microbic nature of gonorrhœa. As far as concerns the infectiousness of latent gonorrhœa, Sänger thinks it not improbable that this is determined by the presence of spores of permanent form, a special form of the gonococcus; more especially since permanent forms of other bacilli, as of splenic fever, are known. In order to limit the frequency of gonorrhœal infection in women, Sänger recommends a general prophylaxis; the dangers of gonorrhœa, he thinks, should be plainly stated to the public; and a married person should be especially warned against intercourse until all traces of the disease are thoroughly eradicated. He mentions a case in which a man had had gonorrhœa ten years before, and still had prostatitis; the wife took gonorrhœa and became sterile. Special prophylaxis should consist in the strictest treatment of infected women; and he thinks it advisable to inject Credé's nitrate of silver solution into the fossa navicularis of the man after impure intercourse, as is done in the Leipzig clinic.

For the treatment of gonorrhœa Sänger recommends the daily use of injections of corrosive sublimate solution, one per cent. After this has been used for some time nitrate of silver solution may be used, with tincture of iodine or dilute nitric acid. These should also be injected into the cavity of the uterus. As regards the treatment of diseases of the uterine appendages dependent upon gonorrhœa, Sänger advises extirpation of the appendages; it is especially important, for the after-results of salpingotomy, that the tubes be thoroughly removed. This operation has been quite frequently performed recently for pyosalpinx; and castration with removal of larger or smaller portions of the tubes still more frequently for oöphoritis and perioöphoritis, In such cases a combined operation, a salpingo-oöphorectomy, is often necessary. Sänger mentioned four cases in which the combined operation had been performed. In one case the results were perfect, and the patient was entirely freed from pain; the second and third cases resulted well; the fourth was but little benefited. Fränkel, of Breslau, said that he had made quite a number of examinations in the Freiburg clinic with reference to the gonococci. Naturally the case is simple enough, if they are found in large numbers. But when only a few or single cocci are found, as is often the case in chronic latent gonorrhœa, or when, after repeated examination of the genital passages and of the secretion, at different times, no cocci are found at all, there must necessarily be considerable doubt. Certainly in old, chronic forms, in which the clinical symptoms have disappeared, the confirmation of the diagnosis by means of the microscope is desirable; and it is just here that we may fail to find gonococci. There are some cases, especially in children, in which the cocci are not so very scarce in the secretion of the vulva and vagina, and yet give rise to no infection on the most complete experiments. It seems, therefore, that the clinical symptoms, as most clearly presented in the vulva, the vulval glands and their ducts, and on the part of the uterus and its appendages, are always the most certain and clear. Nevertheless, the initial microscopical examinations of the secretion in every case are not only desirable but necessary. From the results of Bumm's careful researches, and his differentiation of various kinds of gonococci, it seems that there are, perhaps, in the genital secretions of the female, cocci of different degrees of virulence; and which of these are active and capable of infecting can only be determined by inoculation experiments on the genital mucous membrane of men or monkeys. He asked Sänger whether, since he designated infection as the cause, without exception, of inflammation of the tubal mucous membrane, he would deny the catarrhal salpingitis with its consecutive hydrosalpinx. This is with difficulty diagnosticated, by examination, from purulent salpingitis, but after longer observation of the clinical course of the case it is seen that the accompanying inflammatory phenomena, perisalpingitis, oöphoritis, perioöphoritis and perimetritis, are usually absent in the simple catarrhal form. (*Centralb. für Gynäkol.*, Oct. 11, 1884; *Amer. Journ. Med. Sciences.*)

A New Method of Treating Acute Intestinal Obstruction.—There has recently been advocated and successfully practised a method of affording relief in cases of intestinal obstruction, which may become widely applied. Dr. Kussmaul was the first to advance the view that free washing out of the stomach might prove efficacious, and already cases of marked success following this measure have been published. In one case, after eight days' complete obstruction, and in the other, after nine days', the symptom of fæcal vomiting being present in each, the washing out of the stomach, and consequent evacuation of large quantities of fluid fæcal matter from the upper part of the small intestine, resulted in complete relief from symptoms. The measure is compared by Cahn (*Berl. klin. Woch.*, 1884, No. 42) to the effect produced by laparotomy above the site of an obstruction; and the good result is explained on the ground that the evacuation of the distended bowel affords an opportunity for a spontaneous reduction of a herniated or twisted loop. The relief from the inordinate abdominal distension is very great, and, moreover, the disappearance of this distension favours palpation for the purpose of diagnosis. Obviously, not every case of acute intestinal obstruction could possibly be relieved by this method, but the simplicity of the practice, the certainty of affording temporary relief, and the possibility of a cure, are reasons for its sedulous adoption prior to proceeding to more serious measures. (*Lancet*, Feb. 14, 1885.)

The Treatment of Abortion.—Schwarz, of Halle, has written a very comprehensive treatise (*Volkmann's Sammlung klinischer Vorträge*, No. 241) on this subject, in which he first speaks briefly of the prophylaxis, and then considers in detail the treatment of abortion already in progress. When there exists a pre-existing tendency to abortion, Schwarz believes that only in the rarest instances can premature expulsion of the ovum be averted by continuous lying in bed, by giving up the usual occupation, and by the careful avoidance of all external circumstances and conditions usually considered prejudicial to the pregnant state; the reason being that only exceptionally are the effective causes of abortion external, but in the great majority of cases are to be found in abnormalities of the internal reproductive organs, or in general affections, especially syphilis. The most favourable time, therefore, for the successful exhibition of prophylactic treatment is before impregnation has taken place, attention being directed to the correction of structural anomalies, malpositions of the uterus, especially backward displacements, and inflammation of the endo- and peri-metrium. Schwarz calls especial attention to another factor which he has found to be a frequent cause of abortion, namely, deep lacerations of the cervix, and he points out the importance of repairing such lacerations as a prophylactic measure. After conception has taken place Schwarz believes there is but little opportunity for active prophylaxis, except in correcting uterine displacements and in the treatment of syphilis. Coming then to the treatment of already impending abortion, Schwarz endeavours to lay down certain rules by which it may be determined whether or not the abortion can probably be prevented. He thinks the condition of the cervix affords one of the surest signs: if the cervix permits the passage of the finger through the internal os, if also the lower pole of the ovisac is within reach and is forced down into the upper part of the cervical canal, or if, in the case of primiparæ, although the external os is still impassable, the cervix is already taken up and forms with the uterine body a common cavity, then the expulsion of the ovum is beyond question. A foul vaginal discharge, indicating the probable death of the ovum; or a considerable hæmorrhage lasting several days, especially if accompanied by dull or cutting pains in the sacral region, are almost infallible signs. If a reasonable hope of preventing the expulsion of the ovum exists, the end is to be sought by enforcing the greatest possible bodily and mental rest, and by the free use of opium. If, however, abortion is inevitable, expulsion of the ovum should be hastened as much as possible, with the view of keeping the attendant dangers within bounds. The dangers against which in abortions one has to contend are hæmorrhage and septic degeneration of the ovum. If the ovisac has not ruptured, Schwarz recommends the cervico-vaginal tampon as an absolutely sure means of arresting the severe hæmorrhage which almost without exception accompanies the expulsion of the ovum in the first half of pregnancy. As soon as the hæmorrhage shall have been controlled, the tampon should be removed, and the vagina cleansed and disinfected. A cotton wad sprinkled with iodoform should then be placed against the cervix and held in position with a vaginal tampon. Thus protected against hæmorrhage and septic infection the patient can be left for from eighteen to twenty-four hours: the tampon usually increases the pains and thus promotes the dilatation of the cervix and the expulsion of the ovum. If, however, by this treatment inconsiderable progress is made, Schwarz is accustomed to administer an intra-cervical douche to the amount of two or three litres of a cold antiseptic fluid, using for the purpose a catheter suitably bent and provided with lateral openings. The object of the douche is not so much to dislodge the ovum as to awaken uterine contractions, and the author has found cold irrigations more effective than hot, which latter have sometimes apparently produced paralysis of the uterine muscle. If alternate use of the tampon and the cold irrigation does not effect the desired result, Schwarz then resorts to laminaria tents carefully disinfected and sprinkled with iodoform. Should, however, this method appear too tedious on account of the invasion of fever or beginning degeneration of the ovum, or if for any reason the uterine contractions are not sufficiently powerful to expel the ovum, Schwarz recommends the dilatation of the cervix with Fritsch's dilators, the separation of the ovum with the finger, and removal with finger or forceps as appears most convenient. If at the time that treatment is to be instituted the ovisac has ruptured, an entirely different method is to be pursued. Rupture of the sac, if not positively recognised by escape of the liquor amnii and expulsion of the fœtus, can be diagnosticated with great probability from the diminished size and elasticity of the uterus. In cases of ruptured ovisac, then, the tampon is not to be used, unless provisionally, on account of the danger of concealed hæmorrhage, especially in abortions after the fourth month, and of septic infection from degeneration of retained blood clot or decidua; but if the cervix is not already passable for the finger, it should be immediately dilated manually or instrumentally, and the uterus speedily emptied of its contents. When there exists pelvic effusion or recent inflammatory action, this should be done with the greatest gentleness, and all instrumental interference avoided if possible. The curette is often of the greatest service, especially in cases in which persistent hæmorrhage points to the probable retention of a bit of decidual or placental tissue: the value of subsequent styptic injections of iron or iodine is pointed out by Schwarz, together with many valuable suggestions as to detail in the treatment of this anxious class of cases. (*Boston Med. and Surg. Journ.* Jan. 29, 1885.)

Early Atropinisation in Convergent Strabismus.—M. Boucheron observes that prolonged atropinisation of both eyes appears to be strongly approved of generally, since it hinders excessive efforts of accommodation in those who are long-sighted and those who are subject to astigmatism when they first begin to look at and closely inspect near objects. But he observes it is only applicable when the strabismus is intermittent. It aids, he thinks, the employment of correcting glasses and orthophthalmic exercises, and it prevents amblyopia from taking place in the deviating eye. (*Archives d'Ophthalmologie*, Vol. V., No. 6, p. 542.)

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Department of Public Health.

THE RESULTS OF THE NOTIFICATION OF INFECTIOUS DISEASES.

(*Continued from p.* 231.)

Jarrow (Durham).—Population 25,469 in 1881. Compulsory powers acquired in 1878, the required notification to be made both by the medical practitioner and by the occupier, whether a medical man is in attendance or not. The diseases to be notified are, according to the official paper prepared for the Local Government Board, small-pox, fever, and cholera, but others appear to be notified also. The Annual Report for 1878 was prepared by Mr. J. Spear, who was then Medical Officer of Health for Jarrow. The general death-rate was 23·9 per 1,000, and the mean rate for the ten years 1869-78 was also 23·9. The death-rate from the principal zymotic diseases was 6·9 per 1,000, it being thus materially in excess of the mean rate for the previous three years, which stood at 4·4 per 1,000, the excess being mainly due to 76 fatal attacks of scarlet fever, and 20 deaths from enteric fever. Adverting to the newly-acquired powers, Mr. Spear proceeds:—

> "This year must be memorable in the sanitary history of Jarrow, as being one in which important additional powers for dealing with the spread of infectious diseases have been acquired under Special Act of Parliament, which enable the sanitary authority
>
> "1st. To require the compulsory registration of infectious disease (the responsibility of forwarding information of such disease being placed both upon the medical practitioner and the occupier of the infected dwelling).

"2nd. To provide temporary shelter, or house accommodation, for the non-infected members of a family in which infectious disease prevails.

"3rd. To employ female nurses for cases of infectious sickness.

"4th. To close schools and other places of public resort in neighbourhoods affected by epidemic disease.

"5th. To close shops, dairies, &c., connected with rooms in which infectious disease has appeared, against the entrance of the public; and to prevent the issue from such places of food, clothing, or other articles, liable to retain infection.

"6th. To prevent persons living in rooms in which infectious disease exists from working at such indoor occupations as necessitate the handling of food or clothing, or other articles liable to retain infection, intended for sale, or for the use of persons belonging to another family.

"7th. To afford compensation to those who have sustained pecuniary damage by the exercise of any of the foregoing powers.

"The clause as to compulsory notification of disease was put into operation in the middle of October. It is too early as yet to speak of its practical application, although everything leads us to believe that it will be successful. The medical practitioners concur in regarding it as a right and proper course; and they tell me that hitherto they have received no complaints in regard to its operation from their patients."

Later on Mr. Spear points out that the need for a hospital for infectious diseases has been severely felt.

According to the Report for 1879 the general death-rate, and that from the principal zymotic diseases, were 19·5 and 3·3 per 1,000 respectively. Amongst the diseases which had been notified were—typhus 99, enteric fever 19, and scarlet fever 38. Mr. Spear then continues as follows:—

"As already stated the compulsory registration of disease, a measure which of necessity must form the groundwork of all satisfactory provision for the stamping out of such disease, has been in operation in this district during the year. In its practical application it has been found, it may truly be said, perfect, and has left really nothing to be desired. If one tried hard to find fault, we might say that in a few cases the certificates have not come in at quite so early a date in the course of the case reported upon as was desirable; but on the other hand, much more frequently it has happened that I have received unofficial notice of doubtful cases before a certain diagnosis in regard to them could be arrived at. In one solitary case only, and I have watched for such occurrences, could the suspicion arise that the patient's friends had not sent for medical aid through fear of the case being reported, and in this one case it was merely a suspicion, denied by the parties concerned. So far, again, from this provision bringing the medical officer of health and the medical practitioners into conflict, as had been predicted by some, it has assisted in the formation of a closer and pleasant intimacy between us, and a mutual confidence which was freely illustrated during the year, when on the occurrence of many cases presenting unusual and somewhat contradictory clinical features, I was permitted, without a single objection, to visit such cases, and take clinical

> observations, often twice a day and for days continuously. The medical practitioners of the town are in one accord as to the efficacy and practicability of the measure, and most of them are now its warm supporters; whilst from private individuals I have not heard one single objection, unless a slight demur, only expressed privately, to an unusually late visit I paid on one occasion to a house for the first time, could be called such. The smoothness of its working and the practicability of this measure, are, in short, established by the experience of Jarrow; provided, as has been pointed out to me by my professional brethren, the medical officer of health is not engaged in private practice, and is reasonably conciliatory in his dealings. Then, as to its usefulness. On this point I can speak with the greatest decision in respect of the behaviour of a recent typhus fever outbreak. It may be said that typhoid fever has diminished; that the epidemic of scarlet fever, when we came to be informed of every case as it arose, soon disappeared, whilst in neighbouring districts it continued almost unabated; but this I pass over. It may be due to other causes, while the experience with regard to typhus fever is, I take it, decisive."

After giving an account of the epidemic of typhus, which had, during the year, attacked 99 persons, and caused 18 deaths, and of the manner in which the disease spread from time to time to those who came into contact with the sick, Mr. Spear goes on:—

> "The question will here naturally suggest itself to a stranger . . . . why was not a hospital provided, and the dozen or so sufferers (since you never appear to have had more than that number at one time) removed, and all this trouble and waste of life put a stop to? The question may well be asked. But, could we have done what we did, and, without actually stamping it out (we had not the necessary machinery for that), have kept the disease so completely under control, without our system of registration of disease? Assuredly, no! The disease would almost certainly have become epidemic; and we should only have been dealing with one centre of infection, whilst others unknown to us were arising. And for this reason I think I may justly say that if our Private Act were destroyed at this moment, the benefits that have already accrued from it are such, that the ratepayers would have been more than repaid the cost of obtaining and administering it."

As regards the secondary provisions of the Private Act, lodgings were in one case ordered to be provided for the non-infected members of a family; nurses were in several instances employed by the sanitary authority; the closing of schools and places of public resort was not found necessary; in eight instances shops, dairies, &c., connected with infected rooms were closed; and in six cases persons living in infected rooms were prevented from following their employments.

As regards the hospital accommodation, "the one thing needed to put an effectual end to all the disease and death and misery that we were coolly watching, the sanitary authority could not, or would not, provide."

The Report for 1880 gives the general death-rate as 19·76 per 1,000, and that from the seven principal zymotic diseases as 3·16. Dr. M. M. Bradley had succeeded Mr. Spear as Medical Officer of Health, and, according to his report, the cases notified included typhus 1, enteric fever 25, scarlet fever 16, and diphtheria 7. Some 35 cases of measles had also been notified, but the notification of this disease had hitherto not been encouraged. The only reference to the Special Act which need be quoted is as follows:—

> "When any of the infectious diseases come under the observation of the medical attendant, a certificate is forwarded to the sanitary department, and the medical officer and sanitary inspector visit the spot without delay, and take the necessary precautions against the spread of infection, and action for the abatement of any nuisance on or about the premises. The infected houses are visited almost daily by the sanitary inspector, and frequently during the course of the disease by your medical officer; and thus a strict supervision is exerted, which has not only the effect of detecting anything wrong on or about the premises, but also that of preventing visitors, who, in their kindness, constitute themselves one of the greatest media existing for the propagation of contagious diseases. Although we have no means of isolation, still . . . . in no instance except one" [a case of scarlatina elsewhere alluded to] "was the disease communicated by direct intercourse. . . . No case has arisen requiring the destruction of bedding, the employment of nurses, the providing of temporary shelter, the closure of schools, dairies, or workshops. . . ."

During 1881 the general death-rate stood at 18·3 per 1,000, and the rate from the seven principal zymotic diseases at 2·62. The diseases notified included scarlet fever 40, typhus 1, enteric fever 20, diphtheria 17, and measles 77.

In a case of typhus, Dr. Bradley reports that temporary shelter was provided for the family; the bed and bedding were destroyed, and compensation was awarded under the Improvement Act. The house was also disinfected and fumigated, and no further case occurred. In this case the notification received merely described the case as "infectious," and with regard to this the Annual Report states:—

> "It was decided at the monthly meeting of the council that the medical attendant in this case had neglected to state the nature of the disease on the certificate to the sanitary authority, ... hence a contravention of the Jarrow

> Improvement Act, which states that when the medical attendant becomes aware 'that any inmate of any house is suffering from an infectious disease he shall forthwith fill up, sign, and send to the Corporation a certificate or declaration stating the nature of the disease.' The Act also defines infectious disease to mean :—cholera, small-pox, and fever. A summons was issued against the medical attendant for neglecting to state the name and nature of an infectious disease under his care. . . . . . It was proved by the entry in my diary, by my sworn testimony, and by the defendant's own death certificate, that the case was one of typhus fever. . . . The plea of the defendant was that he knew the disease to be infectious, but that he did not know the nature of the disease; and that it was not until two days prior to the boy's death that he knew it was fever. Notwithstanding the intelligence of the bench, the patent fact escaped their recognition, viz., that before any disease is pronounced infectious it is absolutely necessary to know what the disease is. The case was dismissed."

With regard to this quotation it should, however, be pointed out that Dr. Bradley on receiving the notice at once visited the spot, and on returning to the sanitary office entered it in his diary as a case of "fever," adding for the information of the sanitary officer the words, "probably typhus." "A second visit," adds Dr. Bradley, "confirmed this diagnosis."

In another part of his report Dr. Bradley says that, as a rule, very little time elapsed between the receipt of the notification and the premises being visited, sometimes not more than was necessary to bring an officer from the chambers of the sanitary authority to the reported premises. Of such primary visits 160 were made, and in some instances two or three subsequent ones were paid. The premises were inspected, the origin of the disease was sought after, and instructions were given against its spread.

The 1882 Report gives the death-rate from all causes as 22·6, and that from the seven principal zymotic diseases as 5·0 per 1,000. The diseases notified were :—small-pox 7, scarlet fever 323, measles 147, enteric fever 26, and diphtheria 11. Of scarlet fever it is said that "600 persons must have suffered"; hence multiple cases must largely have occurred in the same houses.

Referring to the scarlet fever prevalence, Dr. Bradley says :—

> "I have now to allude to a Special Act which the sanitary authority has for preventing the spread of infectious diseases, I mean the Notification of Infectious Diseases Act. Incomplete though it be, and with all its drawbacks, I consider it under favourable circumstances a great boon. It is incomplete because all infectious diseases are not scheduled. It is not acting under favourable circum-

> stances, inasmuch as there is not an hospital for infectious diseases. The sanitary authority, to use a homely expression, has placed the cart before the horse; it has taken steps to detect the presence of an infectious disease, and having acquired the knowledge of its existence, it has failed to provide means for the protection of the public against that infectious disease; not because the subject has not been laid before it, not because there does not exist a necessity for an hospital for infectious diseases with a record of 130 deaths from preventable diseases staring it in the face, not because the public object to expenditure, but because there is no power, as is alleged, to compel it. . . . . . To diminish, if not to prevent this amount of suffering and mortality, isolation in hospital is the remedy."

The Report for 1883 is by Dr. A. Campbell Munro, who estimates the population at 28,000, and who records the general and the zymotic death-rates as 23·4 and 5·1 per 1,000 respectively. Small-pox had been epidemic during the year, and Dr. Munro speaks of the existence of a temporary hospital, which appears to have been provided in order to meet the emergency. Measles had also been seriously prevalent and fatal, 82 deaths having resulted from this one disease. Scarlet fever is spoken of as rarely absent from the borough, and an exacerbation of it is reported to have occurred during the months of July, August, and September. As to this disease, Dr. Munro expresses a fear that there is no chance of seeing it disappear until hospital accommodation for its isolation has been provided. The notifications received were 434 in number, viz., typhus 1, diphtheritic croup 2, enteric fever 28, small-pox 31, scarlet fever 143, and measles 229. The cases removed to hospital were 25 of small-pox, and 1 of typhus.

Referring to a tabular form as to the death-rates from the principal zymotic diseases during the last ten years, Dr. Munro says:—

> "It happens that in the first five years of that period, 1874-78, the compulsory notification system was not in force, in the later five years it was. It is interesting then to note that the mean zymotic death-rate of the first period was 5·1, as compared with 3·8 in the second period; that is, the mean zymotic death-rate of the period in which the compulsory notification was in operation is 1·3 under that of the period before it came into force. I have, however, already assured the Committee that compulsory notification in the absence of sufficient hospital accommodation for the isolation of cases of infectious disease, especially in such a town as Jarrow, where in the large majority of cases there is no possibility of efficient isolation at home, is a measure of comparatively little utility."

In connexion with a proposal to obtain a fresh Act of Parliament, "The Jarrow Improvement Act, 1884," Dr. Munro, at the instance of the sanitary authority, convened a meeting of the medical men of the town for the consideration of certain proposed sanitary clauses. As to this the Report proceeds:—

> "It may be mentioned that no medical man was found, after five years' experience of the Jarrow Improvement Act, to object to the principle of compulsory notification; two medical men, however—a principal and his assistant—held that in their notification they should not be required to state the specific nature of the disease, that it was the duty of the medical officer of health to diagnose all cases of infectious diseases notified. . . . The sanitary clauses which have been introduced in the draft of the Bill include one amending the phrase 'stating the nature of the disease' . . . to 'stating the specific nature of the infectious disease,' this in order to remove any doubt which might exist as to the interpretation of the phrase. The diseases notifiable under the present Act, are small-pox, cholera, and fever; in the proposed Act the diseases notifiable are small-pox, cholera, typhus, typhoid, scarlet, relapsing, continued and puerperal fever, measles, and diphtheria, and such other diseases as the Corporation, under the provisions and purposes of this Act, may, for the time being, declare to be infectious. For the fee of 1*s.* payable under the old Act for each notification, that of 2*s.* 6*d.* has been substituted in the new Bill."

The following table summarises some of the statistics which have a bearing on the question under consideration:—

Date.	Estimated population.	General death-rate per 1000 living.	Zymotic death-rate per 1000 living.	Deaths from						
				Small-pox.	Measles.	Scarlatina.	Diphtheria	Typhus	Typhoid	"Fever."
1878	*	—	—	—	5	76	4	—	20	1
1879	*	—	—	—	7	8	1	18	4	1
1880	25,000	19·7	3·2	—	21	3	4	—	4	1
1881	25,469	18·3	2·6	—	4	12	2	1	2	—
1882	*	22·6	5·0	1	10	74	1	—	6	—
1883	28,000	23·4	5·1	6	82	17	—	—	8	—

* Not stated.

Lancaster (Lancashire).—Population 20,663 in 1881. Compulsory powers came into operation in 1880. Notification is required of the medical practitioner attending an infectious case, and also of the occupier, whether a medical man is in attendance or not. The diseases to be notified are small-pox, scarlet fever, diphtheria, typhus, typhoid fever, relapsing fever, puerperal fever, and cholera, with power to extend the provisions to other diseases.

The Annual Report for 1880 gives the death-rate for that year as 22·2 per 1,000 after certain necessary corrections. The Report as published does not contain much detail. It refers to a new hospital, the Luneside Hospital, as having been provided in place of a former one, and it speaks of the new erection as serving its required purposes admirably, but as being of smaller dimensions than are desirable. As regards compulsory notification, it is stated that, "thanks to the kind favour, without exception, of the medical practitioners" of Lancaster, information had been obtained of all cases of infectious diseases known by them. Hitherto, it is added, that information had been given gratuitously, but under the Act recently passed, a fee would in future be paid for each notification.

The 1881 Report, after deducting extra-urban cases admitted into the asylum, gives the true population of the urban district as 19,520, and on this estimate the annual death-rate from all causes was 19·0, and that from the seven principal zymotic diseases was 1·2 per 1,000 living. It is stated that, "of the severer forms of infections disease" placed under schedule to be notified to the sanitary authority, only 3 deaths had occurred, viz., 2 from scarlet fever, and 1 from "fever" of a doubtful character. The cases which had been notified were 72 in number. Of these 61 were cases of scarlet fever, and 24 of them had been removed to the Luneside Hospital, no extension of the disease occurring in any one of these instances. The report also contains evidence as to visitation and disinfection of infected houses.

During 1882 only 3 deaths occurred from any disease scheduled in the Special Act, viz., 3 from enteric fever. But there were some 700 cases of measles in the town, with 43 deaths, the zymotic death-rate being in consequence raised to 3·4 per 1,000. The cases notified by medical certificate were only 28 in number. In one instance scarlet fever was found to have been imported, and no medical practitioner being in attendance, no precautions had been taken against the spread of the infection.

"The parents seem to have been ignorant of the fact that it is compulsory on householders to report cases of infectious disease to the sanitary authority. In this case the parents were cautioned by the authority but not prosecuted. All proper measures, in other cases, were used, and the other children prevented from attending school."

The 1883 Report gives the general death-rate as 19·8, and the rate from the seven principal zymotic diseases as 1·5 per 1,000 of the population. This latter rate does not, however, take cognisance of a special prevalence of enteric fever in the County Asylum. The cases notified were 25 in number, and consisted of scarlet fever, and of cases of enteric fever stated to be traceable to the asylum outbreak. Fourteen patients were removed to the Luneside Hospital. The report contains no special information as to the working of the compulsory clauses.

(*To be continued.*)

RULES FOR THE PREVENTION OF INFECTIOUS AND CONTAGIOUS DISEASES IN SCHOOLS.

The newly-formed Association of Medical Officers of Schools has already done useful work by the issue of a Code of Rules for the prevention of infectious and contagious diseases in schools. The rules are issued in the form of a pamphlet,[1] which has been, to a large extent, prepared by Dr. Alder Smith, the Medical Officer of Christ's Hospital, and Honorary Secretary to the Association. Indeed, the code is admittedly to a very large extent based on the valuable paper on "The Preventive Treatment of Infectious Diseases in Public and High Schools," read by Dr. Alder Smith at the Conference on School Hygiene, at the International Health Exhibition of 1884. The pamphlet is divided into five different sections: one deals with the general hygiene of schools; the next relates to the provision of infirmaries at schools, and deals specially with the separate accommodation needed for infectious diseases. The remaining sections are prepared with considerable care, and we quote them in full as an indication of the sort of work which the Association has set itself to do. They relate to (1) the medical examination of scholars on admission, &c.; (2) the general precautions against the introduction and spread of disease; and (3) the measures to be adopted when an infectious disease has appeared in a school.

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[1] *A Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools*, being a series of resolutions passed by the Medical Officers of Schools Association. J. and A. Churchill: 11 New Burlington Street, London.

Following these sections are two Appendices, one containing forms of certificates which are referred to in the text, and which are suggested for use with reference to the prevention of infectious diseases in schools, and another giving information as to disinfectants, and how to use them.

Medical Examination of Scholars on Admission, &c.

"Certificates should be required on the entry of pupils, signed by the parents or guardians not earlier than the day before the admission; stating that, 'to the best of their knowledge and belief, the pupil has not, for at least three weeks, been exposed to any infectious disease, or entered any house where such disease has existed, (and then should follow a list of these diseases, viz., scarlatina, measles, &c., as per Rule XII., so that no mistake can be made). If this certificate cannot be signed, the child should be sent away to some house free from infection for quarantine, and the clothes should be disinfected at the end of the time.

> "The infectious diseases which the child has already had can be recorded on this primary certificate, and the papers kept for future reference; so that, in the case of an outbreak of illness, the Medical Officer can see how many children are liable to take the complaint.
>
> "In all schools it is advisable to examine each child on admission, when special examination of the head should be made for ringworm; and inspection should also be made of the vaccination marks, and re-vaccination should be insisted upon unless the marks are good or the child has had small-pox.

"When pupils go home for their holidays, a certificate-form, like the one before mentioned, should be sent to the parents or guardians of each child; and should be accompanied by a notice stating that the certificate must be presented by the pupil *signed* on his or her return to school; and that if the pupil happen to be exposed to any infection during the vacation, then *immediate* notice of the facts is to be sent to the school authorities, and on no account is the pupil to return to school until permission has first been obtained from them. Those who return without their certificates should be interrogated by the school Medical Officer; who should have the power to take whatever steps he considers desirable.

> "During term-time, boys are very liable to take infectious diseases when on an 'exeat.' Therefore parents should be warned not to have their children home nor to allow them to enter any house where there is even a suspicion of any infectious disease. If a pupil has been exposed to any infection, then the necessary quarantine should be rigidly insisted upon.

"With regard to the length of quarantine that should be required, if a pupil has been exposed to an infectious disease, this depends chiefly upon whether the school has or has not (that very valuable safeguard) a disinfecting apparatus; which apparatus should be large enough to hold a full sized mattress.

> "If the school possess such an apparatus, then the quarantine should be a day or two more than the longest known period of incubation of the disease in question; if not, the period should be longer still, as there is no definite time when the clothing is certain to be free from infection.

"The following quarantine times, after exposure to infection, may be considered safe *if thorough disinfection be carried out on the pupil's return to school:—*

"Diphtheria	12	days' quarantine.
"Scarlet fever	14	,, ,,
"Measles	16	,, ,,
"German Measles (Rotheln, or Epidemic Roseola) ...	16	,, ,,
"Chicken-pox	18	,, ,,
"Small-pox	18	,, ,,
"Mumps	24	,, ,,
"Whooping-cough	21	,, ,,

> "Disinfection at home should not be relied on, but, immediately on his return to school, the pupil should be washed with carbolic acid soap (10 per cent.), from head to foot, in a hot bath; and clothes, books, and *everything* brought back by him should be completely disinfected."

General Precautions against the Introduction and Spread of Disease.

"Epidemic disease existing in a neighbouring town is often introduced into a school by direct contact with the townspeople; and, if epidemic disease be prevalent, it may be advisable to consider the town 'out of bounds.'

> "Day scholars often bring infection into a boarding-school: therefore parents should be specially warned not to send them to school if there be the slightest apprehension of any infectious disease existing in their homes, because any infectious complaint may be communicated by the clothes of those who come into contact with infected persons.
>
> "A case of infectious disease occurring in the family of a master, or of an official connected with the school, should be rigidly isolated, and, if possible, at once removed from the house, and immediately reported to the school authorities. The master or officer should be advised to undergo thorough personal disinfection before resuming work in the school, and should live away from his house as long as infection continues; especially if the case be one of scarlet fever, diphtheria, or small-pox.
>
> "All servants, tradesmen, or other persons, having access to the school premises should be bound to give immediate notice to the Medical Officer of the outbreak of infectious disease in their houses, and to abide by his instructions."

Measures to be adopted when an Infectious Disease has appeared in a School.

"When the first case of infectious disease is diagnosed it should be immediately isolated in the infectious ward, and the latter should therefore always be in readiness.

> "One of the ordinary nurses can take sole charge, or a fever-nurse may be obtained.

> "The nurses in the infectious ward must be kept completely isolated from the nurses and servants in the ordinary infirmary; and the food, if not cooked in the infectious ward kitchen, should be placed at the bottom of the staircase (which should have volatile disinfectants in it) by the servants, and afterwards fetched by the nurse.
>
> "Scraps of food, &c., should not be sent away from these wards, but they should be burnt, and the crockery should be washed in disinfectants. In short, great care must be taken that infection be not spread by the neglect of apparently trivial matters.
>
> "Those in charge of the infectious wards should take care that boys do not throw paper balls or letters out of the windows, as a means of communicating with their school-fellows.
>
> "Letters, if allowed at all, coming out of the infectious wards should be thoroughly disinfected before they are posted.
>
> "Oiling the skin with carbolic oil (1 in 60) is a useful measure, and should be regularly done during peeling after scarlet fever.

"The next step is to remove the bedding, books, and everything that could possibly be infected, from the dormitory to the disinfecting chamber. Too much importance cannot be attached to this being done immediately.

> "Notice should at once be *privately* given to the matrons or others in charge of the pupils to carefully watch for any symptoms of fever, and to send any child looking ill to the infirmary or the 'sick room,' and to report the matter at once to the Medical Officer.
>
> "It is essential to disinfect the room or dormitory itself.

"After the case has been isolated, the 'sick-room,' or the room where the child was first placed in the infirmary, must be shut up and thoroughly disinfected before any other pupil is allowed to enter it; the bedding also should be disinfected; and, if any more cases occur, the same precautions should be adopted in each instance.

> "It is a good plan to keep a mackintosh outside the entrance to the infectious ward, near some volatile disinfectant, and for the Medical Officer to put it on before he enters. He should also take precautions against the infection of his person.

"The bedding, &c., in the infectious ward should be disinfected after each case; and all soiled linen should be treated with some efficient disinfectant before it goes to the laundry. Even then such articles ought to be boiled apart from the other linen washed there.

> "After even a single infectious case has been treated and removed, the ward should be thoroughly disinfected.
>
> "Schools having different boarding-houses ought to have an ambulance, and it should be disinfected immediately after removing any infectious patient.

"All patients ought to be retained in the infirmary, or in some other isolated building, until free from infection; and, before leaving, they should be washed with carbolic soap (especial care being taken to cleanse the hair from scurf), and their clothes thoroughly disinfected.

"One of the most anxious and difficult duties falling to the lot of the school Medical Officer is the diagnosis and treatment of doubtful cases of scarlet fever. Only those who have experienced it can adequately realise the frequency of such cases, and the great difficulty of dealing with them. The proper treatment is, doubtless, to isolate each suspicious case in a separate room and watch it. But often this is impossible, especially with large numbers. Under these circumstances all such cases may be placed in a large, well ventilated ward (in which a steam carbolic acid spray may be employed), and any very suspicious case removed to a separate room, and, if necessary, isolated for a time, to see whether peeling occurs.

> "No doubtful cases should be sent back to the dormitories; and the clothing and bedding of such should be disinfected.

"With regard to that most important question, "When may a pupil who has had an infectious disease go home, or rejoin the school?"—the following are safe rules to adopt, provided patient and clothes are *thoroughly* disinfected.

"A pupil may go home, or rejoin the school, after

"Scarlet fever—in not less than six weeks from the date of the rash *if* desquamation have completely ceased, and there be no appearance of sore throat.

"Measles—in not less than three weeks from the date of the rash, *if* all desquamation and cough have ceased.

"German Measles (Rotheln, or Epidemic Roseola)—in two to three weeks, the exact time depending upon the nature of the attack.

"Small-pox and Chicken-pox—when every scab has fallen off.

"Mumps—in four weeks from the commencement, *if* all swelling have subsided.

"Whooping-cough—after six weeks from the commencement of the whooping, provided the characteristic spasmodic cough and the whooping have ceased; or earlier, *if* all cough have completely passed away.

"Diphtheria—In not less than three weeks, when convalescence is completed—there being no longer any form of sore throat, or any kind of discharge from the throat, nose, eyes, ears, &c., and no albuminuria.

"Ringworm—when—the *whole* scalp having been examined in a good light, and any suspicious spot scrutinised with a lens—no broken-off stumpy hairs (which give evidence of the ringworm fungus when carefully examined under the microscope) are to be detected.

> "It is sometimes considered that ringworm is cured when the hair commences to grow on the diseased places, but this is a mistake, for it frequently happens that diseased broken-off hairs remain; and the disease may thus exist for months or years. It is often very difficult to detect the short stumps which protrude only a sixteenth or an eighth of an inch; and it is quite useless to examine short cut-off *healthy* hairs from a suspicious spot, under the microscope, for the ringworm fungus.

"Ophthalmia—Any case of purulent or contagious ophthalmia should be at once isolated, and the child should not be allowed to rejoin the school, until there has been a complete absence of discharge for at least one month, or until the inner surfaces of the eyelids are found on inspection to be quite free from granulations.

> "When purulent ophthalmia appears in a school, the under surface of the upper eyelids of every pupil should be turned up and examined, and all those that have any granulations visible should at once be properly isolated.

"With regard to the dispersion of a school on account of an outbreak of zymotic disease, it is always a serious step to take, and should *very rarely be carried into effect.* It often leads to a wide-spread distribution of the disease, causing, perhaps, death in many families. If a large outbreak of scarlet fever were to occur, or two malignant cases in quick succession; a malignant type of measles; an outbreak of typhoid fever; or of diphtheria; then the first step to be taken is to give notice to the parents of the facts, and thus to give them the opportunity of removing their children, if they wish to do so.

> "The onus of removing the pupils should rest with the parents, and not with the school authorities. The latter should rarely go beyond *advising* parents to take away their children.
>
> "To *order* a school to be dispersed is a very responsible proceeding, and should only be done when the mischief is kept up by some local sanitary defect, *which can only be remedied when the children are away.* Thus, if an outbreak of typhoid fever occur, and it is certain that the cause is known and can at once be removed, then it will not be necessary to break up the school; but if, on the other hand, doubt exists as to its origin, or the sanitary defect cannot be immediately remedied, then the school should be dismissed at once.
>
> "Similar objections apply, with some reservations, to the breaking up of day schools. If dispersion be carried out at all, it is probably best undertaken at the very earliest period of the outbreak of an epidemic; after consultation with the Medical Officer of Health, whose knowledge of local conditions will materially aid in arriving at a decision.[1]
>
> "If the pupils be sent home, it is necessary to give the parents sufficient time to make the needful arrangements for isolating them; they should also be informed by the school authorities of the period of incubation of the illness, and, if possible, the clothes should be disinfected before the pupils leave the school.

"As it is incumbent on parents and guardians to do all in their power to prevent infectious diseases from entering schools, so it is the duty of school authorities to take every possible precaution that infectious diseases are not taken by the pupils from the school to their homes. Therefore, if there exist any infectious disease in a school at the end of a term, notices to that effect should be sent to all the parents stating the nature of the disease, and its period of incubation, in order that they may isolate their children on their return home.

> "Through the neglect of the simple precaution here suggested, children are sometimes taken direct to the sea-side at the end of term, after having been exposed to infection at school, and the parents, being unaware of this exposure, are put to the trouble and expense of having their children taken ill away from home; and, moreover, the disease may thus spread to others."

"[1] The power of a sanitary authority to enforce the closure of a school is contained in the Code of Regulations of the Education Department, Article 98, which prescribes as one of the general conditions requiring to be fulfilled by a public elementary school in order to obtain an annual Parliamentary grant, that 'the managers must comply with any notice of the sanitary authority of the district in which the school is situated, requiring them for a specified time, with a view to preventing the spread of disease, either to close the school or to exclude the scholar from attendance, subject to an appeal to the [Education] Department, if the managers consider the notice to be unreasonable.'"

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ANTIPYRIN IN PHTHISIS AND OTHER FEBRILE DISORDERS.

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FOR some years now I have had many consumptive patients under my care, in fact living under the same roof with myself, and the treatment of the febrile state in these persons has been the source of daily thought, indeed I might say of daily anxiety. Those placed in a similar position to myself must have noticed what has struck me forcibly, namely, for what trivial causes the consumptive's temperature will rise. A little extra exertion, a political discussion, an attack of indigestion, a slight fall on the ice which has caused neither pain nor apparent injury, an attack of toothache—any of these things, which to a person in health might mean nothing, often tend in the sensitive phthisical patient to start a degree of fever which it is frequently difficult to suppress. Should the pyrexia continue for two or three days, we are almost certain to discover signs in the lungs of some fresh mischief; perhaps a little softening is detected over an area that had begun to dry up, or crepitation manifests itself in a part of the affected lung, where, after careful examination, it had not been noticed before.

This fever, then, is the first and earliest symptom of lung change, and must, in my opinion, be immediately attacked.

Besides rest, even to the extent of confining one's patient to bed, and careful dieting, one must have recourse to medicinal remedies. I have generally found the following useful, although sometimes one and all have been extremely disappointing: quinine, the various preparations of salicin, digitalis, aconite, kairin, and Warburg's tincture are the principal drugs I have employed, and I find they are more efficient when given in some effervescing form. For the last eight months I have been using "antipyrin," and certainly in my hands it has been more successful than all the other drugs put together. As my experience of the action of the remedy has been mostly in the pyrexia of phthisis, I wish to speak of it particularly with reference to its effect in this disease.

The following cases will perhaps encourage those who have never used this valuable medicine to give it a fair trial.

Case I. In last July I was consulted by a lady—who had spent the previous winter on the Riviera, and who was in advanced consumption—about her health. That morning she had spat up about two teaspoonfuls of blood, and on examining her chest I found a cavity at the left apex, with extensive softening all around it; there was softening also at the right apex in front, but over a limited area; the cough was particularly troublesome, and appeared to be out of proportion to the amount of expectoration, although this was considerable. She informed me that fever had persisted with her in a way that had been considered remarkable by the doctors who had attended her from time to time, and for the last two months she had been taking two grains of quinine twice, and sometimes thrice, daily; but, in her opinion, this had not controlled the pyrexia, for her temperature rose daily to about 102°, indeed, during the last week it had on three occasions reached 103°, being highest at from 4 to 6 P.M. When I visited her it was about 5 o'clock in the afternoon, and I thought it a good opportunity for taking the temperature there and then. I did so, and found it was $103\frac{1}{5}$°, pulse 115. I advised total rest in bed, a light nutritious diet, a dose of Carlsbad salts the first thing in the morning, and the following powder to be given every three hours when awake: Morph. hydrochlor. gr. ⅛, digitalis fol. gr. 1. The next day I saw her at the same hour, and she reported; "At 9 P.M. last night the temperature was just a shade under 103°; slept fairly well, cough not so troublesome, bowels have acted gently, took a pretty good breakfast, and a fair luncheon, and five of the powders ordered; at 10.30 A.M. to-day temperature was 101⅖°." On examining the chest, the signs were the same, the pulse was also nearly as quick as on the previous day (108), and the temperature was exactly 103°. The digitalis then had so far had very little effect on the pulse or on the temperature, and instead of it I now prescribed fifteen grains of the salicylate of sodium, every three hours, in effervescence. On visiting her the next day at the same hour she told me she had not slept so well as on the previous night, that she had had rather more fever (103⅗° at midnight) and her cough had been more troublesome. She had taken six doses of the medicine, but as her temperature was then 103⅕°, and her pulse 118, I determined to try something else. I accordingly prescribed twenty grains of antipyrin every three hours while awake, until three doses had been administered, and advised the temperature being taken just before each dose was given. I saw her next day at the usual hour, and directly I entered the room I noticed how much better she looked. She told me she had taken the first dose of the antipyrin on the previous evening at 6 o'clock, and in less than an hour afterwards she felt more comfortable and less feverish. Accordingly, as much out of curiosity as anything else, she took her temperature, and was delighted to find it was hardly 101⅗°. At 9 P.M., just before taking the second powder, it was exactly 101°, and at a quarter to eleven, 100⅖°. She had slept well, only waking up when the cough troubled her, had eaten better, and altogether felt herself much better and more "comfortable" than she had done for weeks. Her temperature that morning at 10 o'clock was barely 99°, so she had not taken another powder (the third from the beginning) until 2 o'clock on that day when she began to feel her temperature rising, and on using the thermometer, she found it registered 101⅕°. I now tested it myself, and after six minut'es trial with a very perfect and delicate instrument, found the temperature was only 100⅖° and the pulse 96. My patient complained of no disagreeable or unusual sensations; on the contrary, she described her condition as being "very comfortable." I could discover no altered signs in the chest with the stethoscope, and there had been no evacuation of large quantities of expectoration, or anything else that could reasonably account for the fall in temperature, except the action of the drug itself. Moreover, although she had never suffered from ague or any other fever, her sister—"thinking it could do her no harm"—had been giving two grains of quinine as usual, that is, twice a day during my treatment of her.

I have entered into minute details of this case, for it is more than interesting, it is instructive; the rest of it may however be disposed of pretty briefly.

On the fifth day, about forty-eight hours after taking the first dose of antipyrin, she reported:—"Temperature at 9.30 last night, when I took another powder, exactly 100°; this morning, at 9 A.M., $98\frac{4}{5}$°; at 2 P.M., when I took my first powder, it was 99°. Had a good night, cough and expectoration not so troublesome, no perspiration, taking more food, and feel very much better." During my visit on this day at 5 P.M. I took the temperature and found it only $99\frac{1}{5}$°. I ordered another powder at 8.30 P.M., and two hours afterwards the temperature was normal. Sixth day: patient had good night, cough and expectoration still diminishing, no perspirations, appetite and digestion good, spent two hours out of bed, viz., from 12 till 2. Temperature at 9 A.M., normal, at 2 P.M., $98\frac{4}{5}$°, at 5 P M., normal, and at 10 P.M., normal; took a powder at 2 and at 6 P.M. Seventh day: fairly good night, cough and expectoration a little more troublesome than the night before, but slept well on the whole; appetite and digestion good; no perspirations; spent four and a half hours out of bed. Temperature at 5 P.M., 99°, being normal on three other occasions when it was taken; took a powder at 2 and at 6 P.M. Eighth day: almost precisely the same report, temperature normal all day, took two powders. Ninth day: same report.

My patient continued the antipyrin twice a day for four days longer, and once daily for about a week afterwards. During this period she had only an occasional elevation of temperature, the highest registered being 100°. Her cough improved, the expectoration became less, and she was able to take carriage exercise. In a month from the time when I first saw her she had gained three pounds in weight, the expectoration had become markedly less, and she only coughed in the mornings. The physical signs had improved in proportion, for the softening at the right apex had cleared up, and had conspicuously diminished around the cavity at the left side; the cavity itself showed signs of healing, and freer breathing was heard all over the left lung.

This patient remained the whole winter at St. Moritz, and has derived enormous benefit from the climate. She has gained fifteen pounds in weight, her temperature has been normal almost ever since August last; she can walk ten miles with only a comfortable sense of fatigue, and her appetite and digestion have been excellent. Her chest shows an increase of 1¼ inches, and there are signs of emphysema around the portions of lung where mischief had been most active. The cavity itself is very much contracted, and almost quite dry. She is free from cough and expectoration, except in the mornings, and these are insignificant. When the snow began to melt I sent her to Meran. I heard a few days ago from her that, "although she thought she was holding her ground fairly well she felt rather limp, and would return to the mountains directly the snow-melting was over."

CASE II. A gentleman, aged thirty-four, was caught in a mist when coming down a mountain, lost his way for some time, got chilled, and was laid up with an acute attack of rheumatism. He had had rheumatic fever when nineteen years old, and been subject to sub-acute attacks ever since; so much so that he never travelled now without some powders of salicin (twenty grains in each). I saw him the day after his misadventure; he told me he had taken four of the powders, but as they on this occasion had done him no good, he determined to send for me. On taking his temperature I found it was 103°, and the pain in the joints was so great that I at once administered a hypodermic injection of morphia; moreover, I ordered twenty grains of antipyrin every two hours, and a brisk saline purgative. I saw him five hours afterwards; his temperature was $101\frac{3}{5}$°, the pain had considerably diminished, the bowels had acted, and he felt better. I told him to take one of the antipyrin powders every five hours only, unless the temperature showed a disposition to rise, when he might take a dose every three or four hours. I also advised a small dose of morphia, in case of much pain or sleeplessness.

The next day his report was: "Became restless after you left, owing to pain; temperature also increased to $102\frac{2}{5}$°, so I took another powder and a dose of morphia mixture, and slept for four hours. On awaking, my temperature was 101°, the pain was diminished, and so was the thirst; took another powder and had some more sleep at intervals. At 10 A.M., the temperature was barely 100°; made a fair breakfast and took another powder."

When I saw the patient at 11.30 A.M. his temperature was $99\frac{2}{5}$°, the pulse was 82, and he suffered no pain to speak of. I advised him to continue the antipyrin, every four or five hours, and remain in bed. The next day the temperature was normal, the pain had disappeared, and from that time out the patient continued to have no bad symptoms, this favourable result being due no doubt to his taking one or two doses of the antipyrin daily for some little time.

CASE III. At the kind suggestion of Sir Andrew Clark I was consulted in London last June by the friends of a young gentleman who was in an advanced stage of phthisis, as to whether he would be likely to derive permanent benefit from a sojourn at St. Moritz. When I saw him, his temperature was a fraction over 102°, the amount of active mischief going on in the lungs was considerable, and as the family history was a very bad one I decidedly discouraged the idea of his coming to the Engadine. The patient himself, however, had set his heart upon coming, believing firmly that it was the only place that would do him good. Soon after his arrival at St. Moritz he began to pick up, and for the first three or four weeks he gained in health and strength. After this period his old fever returned and with it the cough and expectoration increased, and the chest signs showed that the old softening had come back.

He had been for some time under the skilful care of Dr. Brakenridge of Edinburgh, whose prescriptions and remedies for fever he had by him. I continued these for some time with varying success, until nothing appeared to affect the fever. He had taken quinine, salicylate of sodium, salicin, digitalis, aconite, kairin, strychnia, belladonna, and Warburg's tincture, and still the temperature towards evening was about 102° and occasionally reached 103°. I now tried fifteen grains of antipyrin twice a day, and with marked success, for on the first occasion that it was administered it reduced the temperature from 103° to 101°, and it continued to control the patient's fever during his stay in the Engadine. On some days when he omitted to take the drug the temperature nearly always reached 102°, or even more, whereas on those days that it had been administered the temperature was generally below 100°, and rarely exceeded 100⅕°. Indeed, the patient himself was so convinced of the value of antipyrin that, fearing he might not be able to procure it at home, he took a supply, with him. Shortly after his arrival in Edinburgh I had a letter from his brother, saying, "He still takes the antipyrin, and you have the credit of introducing it into Edinburgh." From this I inferred that Dr. Brakenridge, seeing the value of the medicine in this particular instance, had continued the administration of it. This patient was advised by his doctors to take a voyage to Australia, and I have heard nothing of him since.

Case IV. An anæmic patient of Dr. Garrod's came to St. Moritz to drink the iron waters, and while here I attended him for an acute attack of tonsilitis. When I first saw him his temperature was 102⅗° and he was taking a mixture of quinine (1½ gr. doses) with guaiacum. Although he continued to take this medicine, which had, he thought, been serviceable before, his temperature was 103⅕°, on the next day when I visited him. I prescribed, instead of the quinine and guaiacum mixture, twenty grains of antipyrin every three hours. When I saw him that evening, and after two doses of the drug had been taken, the temperature was only 100⅘°, but as he complained of sickness and vomiting, I thought it advisable to discontinue the remedy, as my experience of its action at this time was limited. I substituted for its use fifteen grains of salicylate of sodium every four hours. Next day at 10 A.M. the temperature was 102⅖°, and at 9 P.M. 103⅗°. As the suppurating tonsil was now soft, I made an incision into it, and evacuated the pus. I need not say that

I had no further opportunity of making observations upon my patient, whose convalescence was rapid.

CASE V. I met Dr. Christeller of St. Moritz in consultation, in a case of very rapid consumption, last September. The patient was a French lady, and when I saw her we agreed that she had not many days to live. Still, it was a matter of the greatest importance to keep her alive as long as possible. We were of opinion that the fever, which all through the illness had been conspicuously high, and had resisted quinine and other remedies, should be attacked with 15 gr. doses of antipyrin, every three or four hours. Although our patient died about eight days after the commencement of the administration of the drug, we found that, by comparing the records of the temperature before and after its use, an average diminution of about two degrees Fahrenheit was gained.

CASE. VI. In July 1884 a lady who was a patient of Dr. Freeman of San Remo consulted me, at his kind suggestion, as to what rules of health she should observe during her stay at St. Moritz. She had spent the previous winter at Mentone and San Remo with some benefit, but had lost all the good derived from these places when sojourning at the Italian lakes in the spring, and since then the cough had been more troublesome, and there had been some fever nearly every day, the temperature generally reaching 100° towards evening. The family history was bad, and on examining the chest I found moist sounds at both apices. Now, when she left England to winter in the south of France, in the late autumn of 1883, Dr. Wilson Fox could discover no mischief except in one lung, so that the case was evidently a progressive one, and had advanced more rapidly of late. I prescribed bitter tonics with antipyrin, and sitting out of doors all day long. She at once lost her fever and began to improve rapidly; both lungs dried up quickly; and whereas, when she was at the Italian lakes in the spring she could not walk a hundred yards, three months after her arrival at St. Moritz she could walk four or five miles. This patient spent last winter at Davos, and I hear that she has had no recurrence of active mischief since she left here in the autumn. Of course I do not pretend to measure out the exact amount of benefit derived from the drug in this instance, or from the climate. Perhaps, the antipyrin having first of all lowered the temperature, the way was prepared for the climate to accomplish the rest.

Case VII. This was a case in which a little girl, aged ten, during the process of tea-making, spilt a kettle, which was boiling over a spirit lamp, over her chest and arm. A good deal of inflammation and skinning ensued, and the child's temperature for four or five days nearly reached 103°. After administering six 5 gr. doses of antipyrin I discontinued its use, for it appeared to depress the child without affecting the temperature, although the pulse was certainly diminished during its employment.

Case VIII. A gentleman who had had a severe attack of pleurisy with effusion four years previously, and had been laid up with pleuro-pneumonia of the other lung in February 1884, consulted me in August last. He said he had only been in St. Moritz four days, and felt so ill that he was afraid the place did not agree with him, and he wanted my advice as to whether he should remain longer. On carefully examining him—it was about half-past three in the afternoon—I found his temperature was 101⅗°, his breathing short, and he was suffering from a dry harassing cough. There were extensive adhesions at both sides, and friction sounds over a large area at the right, and a smaller one at the left side. The view I took of the case was that the journey, especially the long diligence drive, coupled with much increased respiratory function, had taken too much out of him, and set up some dry pleuritic inflammation. I ordered him entire rest in bed, sinapisms, and twenty grains of antipyrin every four hours. Next day his temperature in the evening was 99⅖° and he was considerably better; the day after it was normal until 9 p.m., when it just reached 99°, but only remained so for a very short time. After this there was no more fever, the patient rapidly improved, some substantial expansion of the chest took place, and he left the Engadine very much better than when he came.

Case IX. Another case of dry pleurisy and old fibroid phthisis. For fever, which he frequently suffered from, he had been in the habit of dosing himself with quinine, which certainly appeared to control it. It rarely rose above 101°, and as the quinine had caused headache and other unpleasant symptoms, I advised the patient to try 20 gr. doses of antipyrin. It suited him better, and after a fair trial he wrote to me saying, "I have given up the quinine for the antipyrin nearly altogether, as the latter produces upon me no bad results, and keeps down my temperature better."

Case X. A lady who had spent thirteen years of her life in India and was a great sufferer from intermittent fever, sent for me to attend her during one of these attacks. Like most Anglo-Indians she was a great consumer of quinine, but thought that during the last two years it had somewhat lost its effect, and instead of it, had, by Sir Joseph Fayrer's advice, taken arsenic. Neither of these remedies appeared to affect the pyrexia during this attack, although the patient had been taking 5 gr. doses of quinine every two or three hours for some days previous to my seeing her. Her temperature before sweating began was generally 104° or a little over. I prescribed twenty grains of antipyrin every four hours, and the thermometer never registered more than $103\frac{1}{5}°$ afterwards. Of course, this difference was not a great one, but the patient began slowly and steadily to improve from the time that the drug was employed.

Case XI. Reminds me of the last. This lady had spent fifteen years in India, and her whole system was saturated with malaria. She was likewise so anæmic, that her appearance was quite remarkable. Dr. William Playfair sent her to St. Moritz last winter, thinking that mountain air and plenty of sunshine would do a great deal for her. The result was disappointing to us all, for she said the paroxysms of fever she had whilst here were worse than anywhere else. I tried antipyrin in this case, but it utterly failed—indeed nothing appeared to do much good except morphia, hypodermically.

Case XII. My friend Dr. Allen Sturge of Nice sent me a patient who had been suffering from chronic phthisis for three or four years. He had spent two winters on the Riviera and had at first derived much benefit. He had lately not done so well, and Dr. Sturge was of opinion that a change of climate might be beneficial. In this opinion he was borne out by Dr. Theodore Williams, who examined the patient with me. During the greater part of this winter there has been a tendency to a slight degree of pyrexia; on some occasions the thermometer has registered 102°. Last winter also he suffered from chronic fever. The patient, who is highly intelligent, has been accustomed to watch his temperature, and take quinine and various other drugs when it was high. I prescribed antipyrin for him in 15 gr. doses, and his report of the effect of the drug upon him is shortly this:

"If certain sensations arise which I now know perfectly well from past experience denote an approaching attack of fever, I immediately take one of the antipyrin powders. Generally within an hour or so I feel much more comfortable, and if I use the thermometer my temperature is almost invariably normal, or at most one- or two-fifths above. Neither quinine nor any other drug that I have taken has had such a soothing or beneficial effect upon me. By the use of antipyrin I feel that I ward off a feverish attack—an attack that used to always knock me up, producing headache, lassitude, aversion to food, and general discomfort."

Since this remedy has been freely employed the patient has been steadily improving, and for the last two months he has had scarcely any rise of temperature, and has not been using the drug.

CASE XIII. This was another case of phthisis, but not so advanced. When he first came to St. Moritz, by the advice of Sir Andrew Clark and Dr. Theodore Williams, in November last, there was active mischief going on in both lungs, and the temperature generally reached 102° daily. This was at once lowered by antipyrin and the patient soon began to pick up, being free from fever until March, when, owing to an indiscretion in exercise, he got a severe chill. Softening recommenced in one lung, and the temperature again went up to 102° towards evening. With rest, proper dieting, and 20 gr. doses of antipyrin he soon picked up again. My friend, Dr. Lauder Brunton, who was staying a few days at St. Moritz, and was very much interested in antipyrin, questioned this patient about the action of the drug. He simply replied that it invariably reduced his temperature in a way that no other drug had ever done.

CASE XIV. A captain in the army was sent to St. Moritz by

Sir A. Clark last October. There was extensive softening going on in the right lung when I examined him, with daily fever, cough, expectoration, &c. I prescribed antipyrin with bitter tonics, no exercise, but merely to sit out in the open air. The weather at this time was all that could be desired, and so my patient soon began to pick up. In three days the fever had entirely left him, and the cough and expectoration were considerably better. About a month later the lung was quite dry, and my patient was able to skate gently.

He continued to improve until towards the end of the winter, when, apparently without cause, the softening of the lung and fever returned. As he had had malarial fever in India I thought it advisable to give him quinine freely. This had no effect in lowering the temperature. Next I tried digitalis, but with the same result, although the pulse was diminished somewhat in frequency by its action. After this I had recourse to aconite in effervescence, and I also gave the salicylate of sodium a fair trial. During the administration of these drugs the temperature rose persistently to 102° every afternoon. I must not omit, however, to say that a cavity was forming at the apex of the diseased lung during this period. I now gave twenty grains of antipyrin every four hours, and from that time the temperature began to fall. Four days afterwards it was normal, although the cough and expectoration were still abundant. Dr. Lauder Brunton also saw and examined this patient with me when he was convalescent, and was very much interested with the intelligent account he gave of the effects of antipyrin upon his temperature.

Case XV. This was a patient of Dr. Mitchell Bruce's, who had spent the two previous winters here, and came to St. Moritz, for his third season, last November. He had been suffering from chronic phthisis altogether for about five years, and was very tender and sensitive to mental and other impressions. For example, I have known a decided elevation of temperature to occur in him when worried by a political discussion, the bother of writing a letter to the *Times*, or the contemplation of a bad night by the anticipation of a mouse's presence in his room. He had had fever on and off for the last four or five years, and the remedies which benefited him most were quinine and the tincture of aconite in effervescence. The previous winter I had tried kairin pills in 8 gr. doses, but without the slightest effect. During this winter, when he was suffering from chronic fever, and quinine and aconite appear to have lost effect, I administered one day, at 2.30 in the afternoon, twenty grains of antipyrin. At 6.20 P.M. the temperature had fallen from $101\frac{3}{5}$° to $99\frac{2}{5}$°, but the patient complained of feeling sick and uncomfortable, he could eat no dinner, and nothing could induce him to again try the drug.

Case XVI. Another case of chronic phthisis with periodical attacks of fever. The patient was an American, and although he was not conscious of ever having contracted a malarial fever, the attacks were so characteristic that I strongly suspect he had malaria in his system. He was in the habit of taking Warburg's tincture, and I allowed him to continue it. On one occasion, when he was suffering from pyrexia, I substituted antipyrin for his old remedy. Altogether he took six doses of the drug, but although it certainly lowered the temperature its action did not seem to be so satisfactory as the Warburg, for the latter appeared to effect a reduction of about $2\frac{2}{5}$ degrees, whereas, so far as one could estimate, the antipyrin did not effect a greater change than one degree.

Case XVII. A young doctor with hæmorrhagic phthisis was sent to St. Moritz last October by Dr. Burney Yeo to spend the winter. He had several very large hæmorrhages, and ultimately died. During the inflammatory condition produced by the presence of blood in the lung structures, digitalis and morphia were freely given, but the temperature was generally from $102\frac{2}{5}$° to 104°. Ten grains of antipyrin were now given with the digitalis and morphia for five days, and the temperature never reached more than 103° and rarely more than $102\frac{3}{5}$°. Of course, there is not much to go upon in this case, but I give it for what it is worth.

Case XVIII. A young man, aged seventeen, was sent to St. Moritz by Sir Andrew Clark in August last. He had had pleurisy, and there was a good deal of consolidation in both lungs, which Sir Andrew was afraid might suppurate. He was very subject to catching severe colds—colds which were accompanied by a good deal of fever, the temperature reaching 102°, or a little over. Sir Andrew Clark was evidently much afraid that one of these attacks might set up serious mischief, for he wrote down the following amongst other directions for the patient:— "If you catch cold get at once into bed, and take every two hours, until the feverish stage of the cold subsides, a teaspoonful of solution of citrate of ammonia and half a teaspoonful of sweet spirits of nitre in a wineglassful of water." These directions had been carried out loyally by the patient himself on several occasions, but the temperature was generally not reduced until the next day, although the treatment was perfectly successful as regards warding off dangerous results.

One day when the patient came to me with a temperature of 102° at 4 P.M., I thought I would order him to bed and give twenty grains of antipyrin instead of the usual mixture. At 6 P.M. the temperature was $100\frac{3}{5}$°, and four hours later, after a second dose, it was only $99\frac{3}{5}$°, the skin being soft and rather moist. On a subsequent occasion, when the patient suffered from a similar chill, the drug was used with a like success.

CASE XIX. A young lady, twenty-two years of age, was sent to the Engadine by Dr. Theodore Williams. During the process of softening and excavation, quinine, digitalis, salicylate of sodium, and antipyrin were used at different times. The last of these remedies checked the pyrexia more than any of the others.

CASE XX. Another patient of Dr. Williams, with phthisis in a quiescent state, fell rather heavily when skating. He complained that it shook him very much, and that evening at 7 o'clock his temperature (which for two months previously had been normal) was $100\frac{4}{5}$°. He said he did not feel inclined to eat, and was tired and done up. I advised his going to bed immediately, gave him fifteen grains of antipyrin, and left instructions that he should take fifteen grains more at 9 P.M. Three hours and a half after the first dose of the drug his temperature was $99\frac{1}{4}$°. Next morning at 10 his temperature was normal; at 2, 4, and 9 P.M. it was also normal. He complained of nothing whatever during that day except "feeling a bit tired" and said he had slept well the previous night.

I have administered antipyrin in other cases with great benefit, but as I do not possess such precise details as I have given with regard to the others, I think it is better not to refer to them further.

In conclusion, I can only say of antipyrin that in cases of chronic fever such as we have to deal with in consumption, it has no rival.

Lately, in one of the medical journals there was an account given of a case of poisoning by this drug after thirty grains had been given, and, if my memory serves me right, fifteen grains more after a short interval.

Beyond the few symptoms of disturbance which I have related in my cases, and which were in no way serious, I believe fifteen or twenty grains may be given every four hours to adults, without any fear of bad results.

NATURAL RECOVERY FROM A THERAPEUTICAL POINT OF VIEW.

BY J. MITCHELL BRUCE, M.D., F.R.C.P.

(*Continued from* p. 250.)

II. ACCEPTING the various methods which I have examined as the principal, if not the whole, of nature's means of preventing, relieving, or removing disorder and disease, we have now to enquire *how it has come to pass that nature possesses this power:* what has been the origin, what is the essential nature of this provision. No doubt it exists; but how is it to be represented? Is natural recovery a physiological process, or a pathological process, or what?

The simplest way of accounting for the *vis conservatrix et medicatrix* has been to assume that it was implanted in the human frame along with a liability to disease: that it lies in wait as it were, for "morbific matter," as Sydenham calls it, which it may "thrust forth," by one or other of the methods which I have reviewed. Some of the older systems made the account still more simple by personifying the two influences as demons which reside in the body—the healing power being the *archæus* or *anima.* We smile at such notions now; but have we any reason to smile? Whilst our own belief in nature's healing power may not be less than that of the ancients, is our conception of its exact character and origin more clear?

I believe that this remarkable power of nature, whatever method it may follow, is an outcome of the process of evolution through which our body has passed during the ages of our long descent. The human organism, like all else in nature, has reached its present state of perfectness under the influence of the countless incident forces around and within us. Two great processes have moulded and are ever moulding our organs and functions to an intimate correspondence with the circumstances or conditions which act upon them and on which they react. Those processes are, first, *adaptation*, or the development and improvement of functions and organs by use; and, second, *natural selection*, a kind of indirect adaptation, or the disappearance of organs that are unused or unfit for use—the survival of the fittest. The result of these great processes of evolution is the present accurate correspondence of our organs, both in function and in structure, to the conditions in which we live—to food, temperature, climate, &c., and of our organs to each other in their intimate mutual relations.

Now for our present purpose the important point to be noted is, that both the structure and functions of organs thus evolved are not fixed, but possessed of a capacity of varying within wide limits, in correspondence with variations in their environment. The very essence of physiological perfection is the power of adaptation to varying conditions. Thus the outcome of the evolution of the function of gastric digestion is not simply the ability to peptonise completely a certain amount of nitrogenous food which has been brought into relation with the stomach, but the power to digest with success food or meals of great variety both in quantity and quality—to meet wide extremes of alimentation. The circulatory system is to be regarded as physiologically perfect, not only because the pulse possesses a certain mean force and frequency, but because when circumstances demand, it can rise with safety and even advantage to a much higher rate, or fall in the opposite direction to the benefit of the organism, in close correspondence with the conditions to which it is exposed. And so with the other functions.

It appears to me that there can be no question how this power of variation in functional activity within wide limits has been evolved. Our progenitors have been subjected to every extreme of the natural influences which surrounded them. They had to bear excessive heat and excessive cold, the strain of mountain climbing, the dangers that attend coarse and unwholesome food. Those of their number who survived this ordeal, who were the fittest to survive and did survive, or whose organs became most accurately adapted to these varying circumstances, have transmitted to their descendants organs *which are capable of responding to influences of a degree far beyond the range which is to be called the ordinary.* It is in this way that we find that our organs are all of them larger than is ordinarily necessary: that we all possess more lung-tissue, more heart, more peptic glands than we generally have occasion to require; that our organs are, in other words, endowed with a certain amount of reserve force, and are furnished with the mechanisms of regulation and relief which we have just examined, as in the circulation and the body heat.

Now the *causes of disease* prove to be either nothing more than extraordinary degrees of natural influences, such as extremes of heat and cold, exertion, excessive feeding, &c.; or influences that are extraordinary in *kind,* such as poisons and organisms coming in contact with man, or multiple combinations of these and their inherited effects, known as predisposition, diathesis, &c. The provisions which our organs possess for meeting extreme or extraordinary influences come, therefore, to serve as natural means of preventing or removing the effects of these, that is, disorder and disease. They are essentially physiological in their nature, and they are as surely a portion of the inheritance of our organs as are their ordinary functions. It is little more than a truism to say that the *vis conservatrix* is the means of survival, the power or property which fits man for a *varying* environment, which keeps him alive when other organisms unprovided with it would perish.

When we attempt next to discover *the exact process of evolution* of each of nature's methods of recovery, we enter on an enquiry of uncommon interest, but one of too speculative a character to be more than glanced at in this paper. We have no difficulty in accounting for the development of the first method of natural remedy, which consists in overcoming or counteracting the morbid cause by *increased reaction* or exercise, and which leads to an increase or reserve of force and hypertrophy of the organ. This is an instance of, or is analogous with, the survival of the *strongest*, an event of constant occurrence in the evolution of organic beings.

Apparently opposed to this is the method of natural cure by *rest*. Surely, it will be said, rest cannot have been evolved as a means of recovery side by side with exercise. A little consideration suffices to remind us that all motion is rhythmical, that activity and rest do alternate, that they are essential complements of each other, as we see in work and sleep, in systole and diastole, in inspiration and expiration. There is no such state as continuous activity; there is an occasional rest or pause, however brief, in all vital phenomena; and during this pause there is probably increased nutrition. One principal means which nature adopts for securing rest, is elasticity. The elasticity of the arteries not only provides for a continuous blood stream, but carries on the circulation for six-tenths of the cycle, that is, during cardiac diastole. The heart is the source of all this energy, as well as of the energy displayed during the first four-tenths of the cycle, that is, during cardiac systole. But by this arrangement of an elastic coat and the presence of the aortic valves, the heart does the work of the whole cycle in less than half the time, and rests for more than half the time. By a similar arrangement the respiratory effort is almost entirely confined to the period of inspiration, the elasticity of the chest and its contents sufficing for expiration, so that the muscles may rest.

It appears to me that the method of natural recovery by rest may be traced back to this fundamental physical and vital law of alternate movement and rest. No animal however strong, or otherwise well fitted for the struggle for existence, will maintain itself unless it can retire periodically to rest. So with our organs, which owe their development into their present perfectness as much to the periods of rest which our progenitors enjoyed, as to the periods of activity during which these organs were exercised. Is it not but natural that when they are overcome by injury or disease, rest should be an essential element in their restoration?

By a similar process of evolution, the other modes of natural cure to which I have referred appear to have been elaborated. *Removal of the cause*, as we see in vomiting, is manifestly but another kind of reaction: it is an instance of the stronger overcoming the weaker, and closely analogous with that manner of struggling for existence, in which an organism actively secures for itself more favourable conditions, by directly assailing, combating, and expelling other organisms.

Removal of the effects by regulating mechanisms is probably directly evolved by a process of adaptation, that is, is an instance of elaboration by *use*. *Vicarious action* strongly reminds us of that natural expedient of seeking assistance which an organism adopts when hard pressed in the struggle for existence.

Repair manifestly belongs to a different category from the other provisions for natural recovery, and its origin and significance do not call for discussion here.

III. I return now to the more practical aspect of this discussion, and ask, *What are the limits* of natural recovery? If nature thus works so well, how comes it that she requires assistance? The answers to these questions will suggest the application of the knowledge which we have just acquired, in the Art of Therapeutics.

Now, it is obvious that there is a limit to all natural forms of recovery, for there is a limit to the adaptation of functions and organs to varying conditions. The human body is not yet so perfect (if I may use the expression) as to resist, or otherwise neutralise, all the pathological influences which exist or which may arise around or within it. Several circumstances, however, specially interfere with the action of natural remedies, and these we may briefly review:—

(1) The morbid cause may be altogether *too extreme or crushing* for nature to resist, *e.g.*, excessive heat, producing sunstroke in spite of the elaborate and powerful provisions for regulating the body heat; or overwhelming injuries, defying repair. Or the body may be exhausted by prolonged resistance, and break down before relief comes, as in typhoid fever. This is obviously a matter of personal strength (inheritance), and here we are reminded how urgently nature requires artificial assistance in some individuals compared with others.

(2) The lesion may be *too sudden* for a perfectly efficient provision or remedy to come into play. Rupture of the aortic valves may cause instant death, unless the heart be artificially

sustained, although the same lesion slowly developed would have been successfully met by natural compensation.

(3) There is *a limit to the supply of force* and of the materials for hypertrophy and repair, inasmuch as there is *a limit to the blood-supply.* This is unfortunately only too well illustrated in the heart, where failure of compensation, or secondary dilatation, is so often referable to disease of the coronaries, worn out by nutritive activity.

(4) *New causes* may arise which there is no provision for meeting, *i.e.* altogether extraordinary influences. In this way we can account for the inability of nature to resist the action of powerful drugs when they are first administered, compared with what is known as *habit* in accustoming the body to their action. Thus arsenic, opium, alcohol, and tobacco, become "ordinary" by persistence in their use, and larger and larger doses are required to produce their characteristic effects. But the most interesting illustration of the manner in which the body can acquire and transmit by inheritance this power of resisting pathological influences, is to be seen in the comparatively low mortality which now attends the epidemics of acute infectious diseases, such as measles and scarlatina. The percentage of deaths in our worst visitations is said to be insignificant when compared with the ravages of measles when it is introduced for the first time into a nation or community, such as the inhabitants of remote islands in the Pacific

(5) Another reason of the necessity for giving artificial assistance to nature, is the tendency that exists in the body to the *establishment of vicious circles.* Thus, hepatic disorder induces languor, which in turn increases the biliousness. Anaemia causes dyspepsia and constipation, which further impoverish the blood. We say that "matters go from bad to worse." There can be but little doubt that these vicious circles are referable to the interdependence that has been developed between organs in the course of their evolution. Actions and reactions are constantly going on between organs, as between organs and extrinsic forces; and the disorders or diseases of one organ necessarily disturb these actions and lead to further derangements, which in turn react on the parts originally at fault.

(6) The last cause of the failure of natural remedy to which I

will refer, is the most obvious cause of all: *the occurrence of anatomical change* in the shape of growth or lesion. We know that there are natural means of arresting hæmorrhage, healing wounds, absorbing the products of excessive nutrition ; but manifestly there are narrow limits to these provisions. How marvellous are the recoveries which may occur from extensive and severe lesions, if the parts be artificially protected from infection, we all know, but no doubt the assistance of the surgeon greatly contributes to the happy result.

Thus I have tried to show that Therapeutics rests on as sound a foundation as Physiology and Pathology, because the foundations of the three sciences are essentially the same, and all of them natural. The morbid anatomist confronts us with a specimen of diseased aortic valves, and asks us what could treatment do for that. We point him to the hypertrophied wall of the left ventricle for the answer. That man is not a pathologist who fails to recognise remedy, not disease, in the thickened parietes. He may show us a phthisical cavity, and we demonstrate to him the evidences that excavation is a process for expelling a foreign and destructive organism, and that repair and localisation have been active at every part of the vomica. In the case of those slighter changes in the structure, or it may be only in the functions of organs, which happily do not come under the observation of those who study disease only *post mortem*, we know that many of the phenomena are referable to the reaction of nature against a morbid influence. One and all of these methods are carefully studied and copied by the intelligent therapeutist in the practice of his art, and copied with success, whether by the application of medicinal or of non-medicinal measures. But even more important than this immediate application of the methods of natural recovery is the confidence with which the study of it inspires us, that the science of Therapeutics, however backward it still may be, rests on a sound foundation, on the great law of the Evolution of all things, and will assuredly one day be reared into a noble structure.

EUCALYPTUS IN TYPHOID AND OTHER FEVERS.

BY LEIGHTON KESTEVEN,

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In that most valuable and practical work, the *Practitioner's Handbook*, by Milner Fothergill, I find the following passages—"It is always agreeable to give medicines with a lively expectation of what they will do. Such prescribing always gives a greater sense of satisfaction than when one is driven to prescribe *secundum artem*, or according to an unilluminated empiricism" (p. 13); and "Whatever line of plan the reader may adopt, it should be rational above all things; if there is really nothing else for it, let it be selected by or from a well-chosen empiricism either personal or acquired" (p. 14).

To what I believe to be a "well-chosen" empiricism—although "unilluminated" by scientific inquiry or physiological research—I now desire to direct attention, basing its claim to be well chosen upon its results—in fact upon the "proof of the pudding," after a fairly extended trial in a large general practice.

Whilst resident surgeon at the Brisbane General Hospital the number of cases of typhoid fever was very considerable, there being an absolute epidemic in the town at the time, with a proportionate mortality, and the idea then occurred to me that if the oil of eucalyptus was such an efficient disinfectant as it has lately been demonstrated to be, its germicidal properties might be equally efficacious internally. That is, that if typhoid fever owed its existence to specific germs, such a sure germicide as this should be the true remedy for the disease by destroying its cause.

Acting on this idea a mixture was given containing eucalyptus in tentative doses of from two to five minims made up into an emulsion with mucilage. From these doses I fancied that benefit was obtained, but from various circumstances I was unable to give it the thorough trial which I believed it deserved, and shortly after its commencement I left the hospital, and went into practice in Brisbane when the epidemic was at its worst; I immediately gave it the fullest trial, giving it in every case of typhoid which came under my care.

A large and wide-spread practice which I obtained immediately deprived me of the necessary time for taking methodical notes of my cases, and I can only give a general sketch of the results.

Of 220 cases of typhoid which I attended in about eighteen months there were four deaths only, and of these there was in every case an unfavourable circumstance. No. 1 was a woman of fifty years of age whom I had attended about three months previously for an attack of inflammation of the bowels following on neglected constipation causing obstruction; and notwithstanding my previous warnings I believe she had allowed the same state of affairs to go on again, as on the first appearance of the typhoid I found her bowels again loaded with scybala, and therefore her whole system was unfitted to cope with any severe illness. No. 2 had been ill for a fortnight, and delirious for a week before I was called in, and died the next day. No. 3, a boy of five years of age, was little more than skin and bone from an attack of scarlet fever a few months previously: and No. 4 was a hopeless case handed over to me from a medical friend, much more like typhus than typhoid.

Larger doses than I mentioned as being given at the hospital I found to be necessary to give perceptible results, and I now give ten minims every four hours. Without being absolutely nauseous, however, this medicine does not agree well with all stomachs, but this difficulty can be entirely overcome by careful emulsification, and the addition of half a drachm each of aromatic spirits of ammonia, spirits of chloroform, and glycerine, the latter entirely removing the rough semi-resinous taste of the oil.

The effects of this medicine are, in brief, the following:

First, it steadily and permanently reduces the force and frequency of the pulse. Indeed in one or two cases I noticed this result obtained with almost marvellous rapidity: in one case in particular, the pulse, from being a sledge-hammer pulse of 120, went to 90 within an hour of the first dose of the medicine, and never went above 90 again. Secondly, lowering of the temperature. This occurs less rapidly, and (it has occurred to me) might be entirely secondary to, and dependent on, the lowering of the pulse. To illustrate its *modus operandi* I here append the morning and evening temperatures of three cases occurring in one family at the same time, treated alike as to diet and medicine, all being in one large room, bare of curtains or hangings, and with good ventilation. The third one is case No. 3 of the four fatal cases I enumerated above. I will call them A, B, and C.

	A.		**B.**		**C.**	
	Morning.	Evening.	Morning.	Evening.	Morning.	Evening.
1st day	104·5	—	103·6	—	101	—
2nd ,,	105·4	103·5	102·6	104·3	103·3	102·5
3rd ,,	104	103·2	102·8	103·6	102·4	102·6
4th ,,	106	104	102·5	99·8	101·3	101·5
5th ,,	104	104·6	98·6	103·4	101·9	101·4
6th ,,	101·7	101	98·8	98·6	102·5	101
7th ,,	98·6	99·2	98·6	100·4	101·4	101·4
8th ,,	98·8	98·6	100	98·9	102	Died.
9th ,,	98·6	98·6	98·9	98·6		
10th ,,	98·6	98·6	98·6	98·6		
11th ,,	98·6	98·6	98·6	98·6		

From the eleventh day the temperature never went above normal, and the two survivors (girls aged respectively fourteen and eight years) were kept in bed merely as a precautionary measure for the traditional twenty-one days, without a single unfavourable symptom. The rises in temperature are accounted for as follows:—

A.'s temperature of 106° on the fourth morning corresponds to an attack of violent delirium during the third night, and was reduced by assiduous cold packing during the fourth day. B.'s temperature of 103·4° on the fifth evening to a threatening of of secondary pneumonia, which, for reasons which I will presently adduce, I treated with increased doses (from five going to ten minims) of the eucalyptus, and jacket poultices; the 100·4° on the seventh evening meaning the same. C., the boy of five, died of exhaustion from tympanites and tormina, arising on the sixth day in an already enfeebled system.

These temperatures, to ensure accuracy, were all taken carefully by myself. and in every instance the thermometer was kept in five minutes by my watch. All the three were typical typhoid cases, and none of them were robust or particularly strong subjects, the other symptoms besides the temperature being very marked. The rash was present in all, the abdominal tenderness, the gurgling in the right iliac fossa, dry brown tongue, diarrhœa, dry skin, and sordes on the teeth and gums; and I firmly believe that had it not been for the eucalyptus the temperatures would have been of corresponding height. I have quoted these cases as being the only ones in which I kept a careful and systematic record of the temperatures, and I did so here because I saw the special value of such a record in a little group of cases all under the same conditions, starting simultaneously and treated similarly; but if I had kept similar records of all my other cases they would almost all have shown identical results. Time alone prevented my doing so.

Thirdly, the beneficial effect on the tongue is very marked, almost immediately alleviating the distressing dryness so universal in typhoid, and removing the thick brown coating, leaving but proportionately little fur, and frequently cleaning the tongue entirely in a very short time. I have seen it have an almost magic effect in this direction. In one case I was called in to, I found a young fellow of about twenty-five years of age on the seventh day in bed, in a state of low muttering delirium, with a brown leathery tongue, dry as a board, and with bloody sordes on teeth and lips. I gave him the above mixture, (ten minims ol. eucalypt. every three hours,) and on my visit the next morning teeth and lips were clean and tongue moist, and with nothing more than a slight yellowish fur, and the man perfectly reasonable and collected. I should add here that I ordered an ounce of whisky every hour in soda-water and milk (this latter I regard, however, as merely an adjuvant to the medicine), and constant cold packing.

Fourthly, the skin, along with the reduction in its temperature, becomes moist and soft in contrast with the harsh, dry, hot skin so frequent and persistent, conferring a corresponding increase of comfort to the sufferer, who has previously felt as if his skin had been drawn tight all over his body. This alone is a boon to the patient of no small import.

Having now stated what I believe to be the four principal actions of this medicine, I wish to give a general sketch of the diet and concomitant treatment adopted.

First and foremost I pin great faith to the most liberal administration of free alcohol, whisky (Thompson's "Royal Blend" as being of uniform purity) being the form I order it in. I have given as much as thirty ounces in the twenty-four hours, and firmly believe that the thread of life was only held together and the crisis (of high delirium and thready pulse of 140) tided over by such an heroic plan of administration. In all severe cases I order whisky from the commencement of the case till normal temperature is attained, giving on an average five to ten ounces per diem, usually in milk and soda-water. In ordinary cases I feed the patient on milk thickened with isinglass, beaten-up eggs, milk and soda, cocoa, and—where diarrhœa exists—ground rice and milk. In asthenic cases chicken-broth (concentrated to ten ounces of clear broth from a whole fowl) given in ounce doses to avoid filling the stomach with too large a quantity of fluid for weak digestion, the juice of half-cooked mutton, or beef-tea made in a pot without water and strained through fine muslin.

For the abdominal tenderness frequently-changed ice-cold compresses, and ice to suck; ice to the shaved head for cephalalgia; and frequent cold packs from the head to the knees at any rise of temperature. All the linen is changed morning and evening, without ever altering the patient from the horizontal position. All nourishment given in small quantities at short intervals, thus receiving better digestion than when given in larger quantities at longer intervals.

The diet and nursing, however, I have always considered as by no means of secondary importance, and I have at times been almost tempted to doubt whether by my strict attention to this I was not merely following out the plan of those who assert that not only is no medicine required, but it is absolutely mischievous, and that my new remedy was a delusion, an inert nostrum; until to put it to the test I have in different cases progressing well suddenly discontinued the medicine and seen all the unfavourable symptoms return directly, and then I have been re-converted, confirmed in my faith.

To those who would still assert as above that it was the nursing and diet to which any success that has followed this line of treatment has been due, I answer that, given the same number of cases, and the same dietary and other measures without the eucalyptus, you will not, and have not hitherto, obtained a rate of mortality which—taking the nature of the four fatal cases into consideration—is practically *nil:* and I would (as basing the claim of special virtue to this medicine on no scientific evidence, but merely on the broad ground of conclusions drawn—possibly hastily—from the results of practice) urge that thorough trial should be made of it, and the results of more thorough investigations published.

As Professor Jürgensen of Kiel remarks, "Against facts only fools will fight. Whoever makes it his business to cure the sick, who does not act according to tradition at the bed-side, but knows what he wishes to effect, will not shrink for a moment from acting in the same way." This I met with in a lecture on pneumonia, apropos of the large doses of quinine which he gives to lower the temperature; and in comparing the action of eucalyptus with quinine as an antipyretic one very important point must be borne in mind, and that is, that though quinine in large doses lowers the temperature very rapidly, there is an invariable subsequent rise, whilst as the cases instanced above show, when once we have obtained the reduction after the administration of eucalyptus it is permanent and steadily continues going down till the normal is arrived at, though this result is not so rapidly obtained as by quinine.

How this result is obtained I am unable to do more than conjecture, my idea being that it is purely by its action as a germicide striking at the root of the mischief, thereby depriving the fever of its power. Of course on the other hand it may be similar in its action to alcohol (as advanced by Schmeideberg) by retarding the oxidation; or by dilatation of the cutaneous vessels extending the cooling area, as Fothergill has it; or by some effect upon the nervous system; but by whichever mode it acts its true properties remain to be demonstrated. The extraordinary shortening of the duration of the fever which it effects is most notable. I have (as I mentioned above) as a matter of practice kept my patients in bed for the traditional twenty-one days, but under its effects the duration of the fever has been that length in but very few cases, the tenth day being just as often the termination of the elevation of temperature.

Experimentally I have given this drug in two or three cases of pneumonia with the most marked benefit.

RESEARCHES RELATING TO THE PATHOLOGY AND TREATMENT OF CHOLERA.

BY T. LAUDER BRUNTON, M.D., F.R.S., AND P. H. PYE-SMITH, M.D.

(*Continued from* p. 275.)

WE must now turn from questions regarding the propagation of the disease, and the virus by which it is propagated, to a consideration of the *symptoms* of persons attacked by cholera.

At the beginning of this paper we drew special attention to the distinction which must be made between the yeast torula and the alcoholic poison which it generates. In like manner we must distinguish between the fungus which yields muscarine and muscarine itself, and we must carefully distinguish between pathogenic microbes and the poisons which they may produce. Nay more, we are beginning to distinguish not only between micro-organisms and the products of their growth, but between the micro-organisms and the ferments through which they produce these products. Thus some microbes in a solution of urea will, during their growth, decompose it with the formation of carbonate of ammonium, just as a man who has eaten a piece of bread will decompose it, converting it in his organism first into sugar and ultimately into carbonic acid. When our chemical knowledge was less precise, we were obliged to look upon this process as vital, and we could not separate the unorganised ferments or enzymes by which the starch was converted into sugar. Hitherto we have been much in the same position in regard to microbes, and we have been obliged to connect the decompositions they produce, *e.g.*, of urea into carbonate of ammonium, with their vital properties. It has now been shown by Musculus, and recently much more perfectly by Lea, that ferments may be extracted from microbes just as they can be from mammals, so that from the microbe which decomposes urea an unorganised ferment or enzyme may be separated which has a similar action. This enzyme will convert urea into carbonate of ammonium just as ptyalin will convert starch into sugar; and these enzymes act quite independently of the presence of the microbe or of the animal from which they were respectively derived. When pathogenic bacilli such as the bacillus anthracis are inoculated into an animal, they pass into the blood and reach all the organs of the body, thus producing disease or death. In regard to the morbid processes which they originate, we are at present in much the same condition as we formerly were with regard to the conversion of urea into carbonate of ammonium. We can only connect the morbid processes in the animal with the life of the bacilli which have invaded it, but we are unable to say how far these morbid processes are due to the mere mechanical irritation caused by the bacilli in the tissues; or how much is due to ferments which they produce and which act upon the tissues or blood; and how much to poisonous products which the bacilli produce through those ferments. In the case of cholera the question is simpler, for both Koch and Klein have come decidedly to the conclusion that whatever the cause of cholera may be, "neither the blood nor any other tissue contains comma-bacilli or any other micro-organisms of known character."

We may thus set aside at once the question of how far the symptoms of cholera are due to the presence of organisms in the blood, and consider the other possible causes of the disease.

These are two. First, we may regard cholera as a local disease due to changes in the alimentary canal, and affecting the general system only in so far as reflex influences conveyed by the intestinal nerves will affect the circulation and respiration, and as the withdrawal of water from the blood by the copious discharges into the bowel will affect the circulation and modify tissue changes generally.

Secondly, we may regard cholera as both a local and a general disease, and suppose that in addition to the local alteration in the intestinal canal already mentioned, there is a condition of poisoning throughout the whole organism due to a chemical substance produced in the intestines, absorbed from them into the blood, and carried throughout the body by the circulation. Perhaps this distinction may be rendered clearer by an illustration. Suppose a man to eat a half-ripe apple, the irritation produced by the indigestible material in the alimentary canal may produce vomiting and purging. The irritation may reflexly, through the nervous system, cause rapid respiration, a weak pulse, and a pale skin. But no poison has been absorbed into the blood; the symptoms are all due to the local action of the indigestible material upon the intestine, and we cannot separate from the apple any poison which, when injected into the circulation in small quantities, will produce similar symptoms. Let us suppose, however, that a man eats poisonous mushrooms. Then we have vomiting, purging, paleness of the face, and general depression, just as in the former case; but in addition to this we have a thready pulse, extremely rapid respiration, a somewhat cyanotic condition, and probably death—these further symptoms being due to the absorption of a chemical poison, muscarine, from the intestines into the circulation, where it acts upon the nervous system and heart. Which of these two kinds of poisoning does cholera most resemble? There can be little hesitation in answering that it resembles poisoning by mushrooms rather than by green apples, for the disease is not only extremely and rapidly fatal—much more so than other kinds of local intestinal disease—but we find that the local changes in the intestine are not at all in proportion to the severity of the attack. As already mentioned, in some of the most rapidly fatal cases the changes in the intestinal canal are very slight indeed, whereas in others, which have been less severe and less rapidly fatal, the intestinal lesions are very well marked. This view that cholera is due to the action of a poison which has been absorbed in the general circulation was expressed by Parkes in his excellent work on cholera. It is also the view of Koch, who regards the symptoms of cholera as due to poisoning by poisonous substances formed in the intestine under the influence of the comma-bacilli. In support of this view he mentions that in one of his observations the nutritive gelatine on which he was cultivating comma-bacilli contained, at the same time, a considerable number of blood corpuscles. When the gelatine was spread on a glass plate it had an appearance as if reddish dust was suspended in it, from the blood corpuscles which it contained. As colonies of comma-bacilli grew in this reddish granular gelatine each colony appeared to the naked eye like a little colourless hole; when they were observed microscopically it was found that the colonies had destroyed all the blood corpuscles widely around them—much more widely than they had liquefied the gelatine. This shows that the comma-bacilli can exercise a destructive action on the formed elements of the blood, and probably also on other cells. We may add that this observation shows also that the destructive influence is exerted not by the comma-bacilli directly, but indirectly by their products, for the liquefaction of the gelatine and the destruction of the blood corpuscles occurred considerably beyond the limits of the colony, and therefore at some distance from the bacilli themselves. The fact that the blood corpuscles were destroyed more widely than the gelatine was liquefied, may possibly indicate that the liquefaction of the gelatine occurs through a ferment produced by the bacilli, and that the corpuscles are destroyed not only by the ferment itself, but also by a chemical poison produced through the agency of the ferment.

The view that the symptoms of cholera are due to a chemical poison is also supported by the experiments of Lewis and Cunningham. They found that when cholera dejecta were introduced directly into the veins of an animal, intestinal affections (without signs of cholera) were produced more frequently than when those of healthy people were employed. The toxic effect of the dejecta was not diminished by boiling, as one would expect if it were due to organisms and not to a chemical poison. All the evidence that we have before us, then, goes to show that the symptoms of cholera are produced by a chemical poison, and that Koch's fifteenth question must be answered in the affirmative. The mode of action of this poison we will consider presently, but before doing so we will take Koch's sixteenth question.

Is the discovery of the comma-bacilli applicable to diagnosis?

As we cannot yet regard the comma-bacillus as having been proved to be the cause of cholera, this question must at present be answered in the negative. If the comma-bacillus or any other definite organism were proved to be the cause of cholera, we can at once see how useful such a discovery might be in regard to diagnosis. At present it is often difficult, sometimes impossible, to diagnose between cases of *cholera nostras* and *Asiatic cholera.* But if an organism were proved to be the cause of Asiatic cholera, the diagnosis could be made at once, and proper means adopted for preventing the spread of the disease.

We now proceed to consider the mode in which the cholera poison probably acts. The two most marked symptoms in cholera are—the profuse intestinal secretion and the alterations in the circulation. There can be little doubt that the alterations in the circulation are to a certain extent secondary to the profuse discharge from the intestine, and to the thickened condition of the blood induced by the removal of such a large proportion of its water and salts. This seems to be proved by the marvellous results produced by the injection of saline solution into the circulation in the stage of collapse. When such injections have been made, the patients, who, at the moment of operation, were shrunken, pale, somewhat livid, pulseless, and voiceless, became plump, and recovered their natural colour, their pulse became full and steady, and they sat up in bed conversing with their friends, apparently almost well. As the chief, if not the only effect of the saline injections is to restore the blood to its normal fluidity, we can hardly explain their wonderful effects otherwise than by supposing that the symptoms thus removed were due to a thickened condition of the blood. Unfortunately the improvement produced by saline injections was only temporary. After a few hours the symptoms returned, and the patients so treated died almost without exception. But though it is most probable that the changes in the circulation are to a great extent due to alterations in the blood, brought about by the copious discharges from the intestine, it is at the same time probable that the changes in the circulation are to a certain extent independent of the alterations in the blood, and are partly brought about by a poison circulating in the body. One reason for supposing this is, that, as we have already mentioned, the general symptoms are by no means always in proportion to the local changes in the intestine, or to the amount of discharge, for in some cases, where the discharge has been great the general symptoms have been moderate, while in other cases the general symptoms have been severe although the discharge has been comparatively small. (And here it may be well to correct an inaccuracy which occurs in an earlier number of this journal, where one of us, in discussing the stoppage of the circulation through the lungs in cholera, regards the explanation given by Parkes and Johnson as identical. This is not the case, for Parkes regarded the stoppage as due to a condition of the blood while Dr. Johnson regards it as due to active contraction of the pulmonary capillaries.)

Claude Bernard records an observation which is of considerable interest in relation to this question, but he gives no authority for it; he states that a Russian physician found a slow pulse in cholera patients for several days before the attack. If this observation were confirmed, it would tend to show that a poison had been present in the body and acting on the circulation for several days before the intestines became affected.[1]

The question whether the poison acts on the intestine only, and on the circulation secondarily, or whether it acts on both the intestine and the circulation independently, is of considerable importance in regard to treatment. If the action of the poison is a merely local one upon the intestine, then the remedies most likely to be serviceable will be local ones; whereas if the action be double, remedies will be required which will act on other parts of the body than the intestine alone.

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[1] Bernard's *Lectures on Experimental Pathology and Operative Physiology*, 1859-60.

(*To be continued.*)

SHORT NOTES ON THERAPEUTICS.

BY H. MACNAUGHTON JONES, M.D., F.R.C.S.I., AND EDIN.,

Examiner in the Royal University.

(*Continued from* p. 261)

OCULAR THERAPEUTICS.

ONE of the most remarkable cases of extreme contraction of the pupil (uniocular), existing for a length of time, without any symptom of disease in the nervous or vascular systems elsewhere to account for it, which has come under my notice, was that of a woman who was under observation for two years in the Cork Ophthalmic Hospital. She was a widow, about fifty-six years of age, of full habit, and apparently in vigorous health. There was no evidence of any incipient cerebral or spinal affection. Her heart sounds were healthy. The urine was normal. The only disease she remembered having suffered from was rheumatism, and this not severely. She came complaining of the *look* of the left eye. The pupil was contracted and remained so, when not influenced by mydriatics, during the whole time she attended me. The contraction was extreme. She was hypermetropic; her distant vision with the affected eye was 20-40. There was no change in the size of the pupil during accommodation. It yielded, but not to more than a medium degree of dilatation with atropine, more so with duboisine. Eserine had no perceptible effect on the minute pupil. There were no ophthalmoscopic appearances. Periodically I examined her closely for any evidences of hemianæsthesia or anomalous reflex signs, but there were none to note. When last I saw her she was in the same state as at her first visit. I frequently discussed the possible source of so persistent a myosis with the students and its probable irritative or paralytic origin. It may be that ere this she has developed symptoms of tabes dorsalis. But the case was an interesting one so far as showing the length of time, prior to the appearance of other symptoms, pupil changes may indicate commencing disease in the brain or cord.

Nor in referring to the influence of general constitutional states in determining therapeutical indications can we omit a passing allusion to *syphilis* and syphilitic states. This I do if only to press the importance of the early and judicious use of mercury in syphilitic conditions, whether of retina, choroid, or iris. It may seem ridiculous to allude to this. But just as the ophthalmic surgeon constantly sees an eye deformed and vision lost from the neglect of the use of atropine, so he frequently finds retinitis which has passed into atrophy, or iritis which has left unalterable adhesions and permanent disorganisation from the want of a properly administered mercurial course. I cannot recall to mind a single case of syphilitic retinal or iritic inflammation where mercurial treatment, combined with the employment of a mydriatic, was early adopted, in which there was any serious permanent deterioration of vision, whereas I have seen numbers of cases in which retinal atrophy, permanent indurations, choroidal changes, and iritic closure and adhesions, with permanent loss of vision, were the results of the omission to adminster mercury in time. Much of this comes, I feel sure, from the too ready acceptance of patients' assurances that there cannot be, and never has been, any specific taint.

When we call to mind the large proportion of cases of choroiditis, choroido-iritis, choroido-retinitis, papillo-retinitis, which is directly due to syphilis, the necessity for remembering this susceptibility of the choroid to the ravages of syphilis is obvious. In speaking of plastic choroiditis, Wecker says: "in four cases out of five syphilis is the important factor." Syphilitic iritis has in its train choroido-retinitis, vitreous disorganisation and opacities and retinal atrophy, in addition to the commoner lenticular changes which are the consequences of posterior synechia and interferences in the nutrition of the crystalline lens.

How often do we not see patients with undoubted evidences of syphilis in its secondary or tertiary stages, and recognise its "reminders" in skin, eyes, throat, tongue, or periosteum, who emphatically deny having ever had any primary sore or even a gonorrhœa? And more frequently still we are consulted by those who truthfully state that they never have suffered from more than a discharge, yet in whom we recognise clear signs of exanthematic syphilis. In such cases I believe it to be a thoroughly safe plan "to give the prisoner the benefit of the doubt" and treat the case as one of specific disease. Here the sin of commission is much less likely to lead us and our patient into trouble than the opposite one of omission.

Most necessary is it to insist on the importance of the early recognition of the syphilitic taint in infants and young children. I have known several children who have safely passed the critical period of life, puberty, without ocular, nasal, or aural mischief of any kind, who had syphilitic manifestations when infants, and who were cured by specific treatment systematically continued for some time, who, but for it, I feel confident, would now have some permanent lesion. I have never seen the course of mercurial inunction, secured by rubbing in small pellets of mild mercurial ointment into the soles of the feet or the groins at stated intervals, until the stools manifest its therapeutical action, do an infant harm. Let the child be but properly supported and kept warm during the administration and no ill effects can arise. Chlorate of potash with small doses of liquid extract of cinchona are useful adjuncts, while this treatment is supplemented by the addition of iodide of potassium in doses proportioned to the age of the child, and later on by the exhibition of iodide of iron. So I prefer mercurial inunction when possible, to every other method of administering mercury (either fumigation or subcutaneous injection), for its specific effects. I prefer it particularly in syphilitic affections of the eye, because it is comparatively rapid in its manifestation, because its effects can be so well regulated and controlled, and it is so easy of application. Not but that I have been taught in years gone by that mercurial inunction like any other mode of administering mercury must be determined on with care, carried out with accuracy, and due supervision and daily attention given to the state of the gums. Otherwise sudden and ugly symptoms of mercurial poisoning may arise. But I have known severe toxic symptoms supervene from five grains of blue-pill given in two aperient pills, so far as profuse salivation, swollen glands and great prostration. And, after two days' inunction in a case of iritis, I have seen such aggravated ptyalism and swelling of the gums ensue that the patient's friends imagined an excessive quantity was ordered, and this from three rubbings in the day of mild mercurial ointment, not more being used each time than about thirty grains. These are common experiences of others. I think the familiar check of desiring the patient from the commencement to rub the gums three times daily with his handkerchief, and on the least tenderness, to cease or modify the applications, is a judicious one, at the same time that a patient undergoing mercurial inunction should always be kept under close personal observation.

I think it advisable, when the least tenderness of the gums is detected, to advise a mouth-wash of boracic acid with chlorate of potash, in eucalyptus water. Should the tenderness increase, besides the ordinary astringents of rhatany and myrrh in wash, a solution of chromic acid, five to ten grains to the ounce, will be found an admirable application, touched to the sensitive parts with a camel's hair pencil.

(*To be continued.*)

Reviews.

The Curability and Treatment of Pulmonary Phthisis. By S. JACCOUD, Professor of Medical Pathology to the Faculty of Paris, &c. &c. Translated and edited by Montagu Lubbock, M.D. London: Kegan Paul, Trench and Co. 1885.

Bacillary Phthisis of the Lungs. By GERMAIN SÉE, Professor of Clinical Medicine in the Faculty of Paris. Translated and edited by W. H. Weddell. London: Kegan Paul, Trench and Co. 1885.

PROFESSOR JACCOUD'S work has all the charm of the production of a powerful mind which cannot avoid a certain amount of self-assertion. Such authors study the subject before them, they read the works of others on the subject, and they digest all the impressions received; the result is the formation of decided views, which are set forth as the authors' own. This is a natural process, and it has, no doubt, great advantages to the student: he is attracted by the authoritative statement of opinions, and does not care how they have been formed, and whether others have perhaps held similar opinions though expressed in a less general, less decided, or less dogmatic manner.

The prominent points in Jaccoud's teaching are that phthisis is essentially the result of malnutrition and that it is preventable, and when established curable in all its stages. He maintains the opinion which he has repeatedly expressed in earlier works, that inflammation plays a most important part in the production of tuberculosis, and that "the only substantial basis of prophylactic or curative treatment is furnished by the notion of imperfect nutrition, and by a knowledge of the baneful influence of inflammatory processes." The author's views are further elucidated by the following quotations from page 9 of the English edition:—

(I.) Caseation is at all ages the result of debility,

(II.) The origin of true tubercle is the result of debility.

(III.) The common forms of accidental irritation of every kind affecting the larynx, bronchial tubes, or lungs, have a deleterious effect upon tuberculosis and phthisical lesions . . . .

Jaccoud, writing before the discovery of Koch's tubercle-bacillus, accepts the anatomical and histological unity of phthisis, but he affirms a clinical duality. "This duality I fully maintain, and whether its causation, and specially the hereditary tendency, its symptoms and course, or the prognosis be considered, the pneumonic or caseous form whether microscopically tubercular or not, differs, and always will differ, from the ordinary form of tubercular phthisis" (p. 12).

Two chapters are devoted to the conditions which influence the curability of pulmonary phthisis; and on prophylactic treatment good advice is given on residence, diet, gymnastics, hydrotherapeutics, and sea-voyages. The same advice, with necessary modifications, is enforced in the first chapter on the treatment of the developed ordinary forms of phthisis; the author also expresses his faith in large doses of cod-liver oil and in arsenic. Our own experience agrees with Jaccoud's as to the beneficial effect, at all events in a certain number of cases, of the long-continued use of arsenic, beginning with small doses, namely, about $\frac{1}{60}$ grain twice a day at meals gradually increasing to $\frac{1}{10}$ grain and even more, these larger doses being continued as long as tolerance is maintained. The author's plan is milk early in the morning and between the midday and evening meals, cod-liver oil at the beginning of or during meals, and arsenious acid at the same time.

Jaccoud is a great advocate for counter-irritation, especially in the subclavicular region; he recommends this local treatment to be continued for a long time, and thinks that "the different modes of practising counter-irritation are almost equally good, and flying blisters, points of red-hot iron, or caustics may be employed according to the case." Amongst other means he especially advocates the old, somewhat severe, and in this country nearly disused plan of applying the *pasta Viennensis*, made of caustic potash, quicklime, and water (p. 154). We confess that we are generally satisfied with preparations of iodine, acetic acid, and occasionally croton oil dissolved in oil of turpentine.

The author speaks of the different causes and of the injurious effects of pyrexia in phthisis, and regards as the best remedies hydrobromate of quinine, salicylic acid, and salicylate of sodium; he is much in favour of the latter which he often uses hypodermically, without having produced sloughing by this process excepting in a few cases. If he wishes to obtain a speedy and full effect he injects twenty-two grains of the salicylate dissolved in the same quantity of water. Jaccoud remarks, however, that in persons afflicted with alcoholism the salicylate exercises scarcely any antipyretic effect, while the hydrobromate of quinine does. The salicylate of sodium is no doubt very useful, but it occasionally exerts a depressing action on the appetite and on the general condition, although this fortunately is much less frequent and less severe than after the administration of antipyrin. We may mention, however, that in several cases within our experience all antipyretic drug-treatment has proved inferior to the use of alcohol combined with open-air nursing in hammocks or on couches placed under tents or under trees.

We cannot follow the author through the treatment of the various complications occurring in the course of phthisis, nor can we discuss the chapter on mineral waters; but we cannot pass over his remarks on climatic treatment, a subject which has received the author's special attention. He strongly condemns the routine of sending all cases of phthisis and incipient phthisis to warm climates, and after having discussed the elements which should guide the practitioner in selecting different climates for different cases and stages of phthisis, he endeavours to explain the effects of high climates on the organism in general and on the respiratory functions in particular. He divides all climates, with regard to the treatment of consumption, into two groups: (1) climates in high situations which have only a slight atmospheric pressure, and (2) climates of the plains or of only moderate elevation and with moderate barometric pressure. The principal representatives of the first group are above 4,900 feet, though some are lower; those of the second group less than 1,300 feet above sea-level. The climates of the first group possess, in the author's view, the most useful influence in the prevention and cure of phthisis by improving the general nutrition, the local condition, and activity of the lungs, and by preventing congestion of these organs; while those of the second group "fulfil none of the indications drawn from the nature of the disease" (p. 297). "The mechanical action which results from a rarefied atmosphere is absent, the tonic and fortifying effect is insufficient, and the special purity of the atmosphere peculiar to high altitudes does not exist." The latter objection may be questioned with regard to some climates belonging to this group, as the air on the sea and in the desert is, as a rule, absolutely pure. The possible advantages which Jaccoud concedes to these climates, if they are sufficiently temperate and equable, are the favourable effects on existing bronchitis and pulmonary catarrh, and in the prevention of fresh bronchitis and pneumonia; or, in other words, the possibility of out-door life, with the healthful effects of the sun and the open air upon the organism without the risk of chills and other accidental complications.

The two most prominent amongst the counter-indications to residence in high climates mentioned by the author are: (1)

excitability of constitution whatever the stage of the disease may be; (2) the wasting period of the disease. It is, however, difficult to lay down positive rules. Thus the author excludes the pneumonic form of phthisis from Davos and other stations of this group, and he may be right with regard to a large number of cases; yet we have the notes of several cases of this form where the stay at Davos during the six or eight coldest months of the year has effected arrest of the disease, and the first step to permanent cure in three of them.

The author enters pretty fully into the qualities of the climates of the Engadine and of the Davos valley, and also of Goibusdorf and Falkenstein; but he does not mention either the Peruvian Andes or the Rocky Mountains.

Jaccoud is much opposed to the usual plan of sending the patient to one place in summer and another in winter, and advises that whenever practicable the patient should remain in the same climate the whole year round. This cannot be done in the warmer climates, for instance, the Riviera, as the heat of summer would exercise a depressing effect on the whole constitution; but it can be carried out in the climates of elevated regions, such as the Alps, the Andes, and the Rocky Mountains.

The manner in which Jaccoud discusses the climatic treatment of phthisis shows that he finds great difficulty in overcoming the old prejudice, that cold exercises an injurious and heat a beneficial influence on phthisis. In the January number of 1870 the late editor of the *Practitioner*, when reviewing works and papers by Brehmer, Spengler, and Küchenmeister in the German, and by Hermann Weber in the English language, on the favourable influence of mountain climates in the treatment of consumption, expresses himself in a very similar way, and regrets that "among some of the older English practitioners there has been manifested a rather unreasonable reluctance to give the new facts a fair hearing." In England much progress has been made in this respect; and we may hope that the same will be the case in France. Jaccoud seems not to be aware that Archibald Smith was the first physician in Europe to point out, more than forty years ago, the favourable influence of residence in elevated regions on phthisis.

We have said enough to show that Jaccoud's work is full of practical and hopeful teaching; and it remains for us only to express our gratitude to Dr. Lubbock, the editor of the English edition, for his careful translation, and for the trouble he has taken in his notes to explain the whereabouts of the different localities mentioned by the author, and the sources whence the reader may obtain further information on the subject.

As we have already fully reviewed Professor Germain Sée's work on *Bacillary Phthisis of the Lungs* at the beginning of the present year, we have only cordially to welcome the translation by Mr. W. H. Weddell. The section on therapeutics has been considerably abridged, a simplification which to a great number of English readers may be convenient, while others may perhaps be led to refer to Professor Sée's views in the French original.

Messrs. Kegan Paul, Trench and Co. have done a good service to the profession by placing these two important French works on phthisis before us in an English dress. The comparison of the views of the two great authors (Sée and Jaccoud) on the causation of phthisis and on the manner in which different agents influence the course of the disease, will be instructive and interesting.

Manual of the Antiseptic Treatment of Wounds. By W. WATSON CHEYNE, M.B., F.R.C.S., &c. Crown 8vo., with illustrations. London: Smith, Elder and Co. 1885.

IN the work before us Mr. Cheyne has given to the surgical world the most complete account extant on the subject of antiseptic wound-treatment. It is designed, he tells us, for the student, but few can peruse it without adding something to their knowledge of antiseptic surgery. We can only regret that on some points he is not a little fuller. A few more pages on the history of the origin of this mode of treatment would render the whole subject clearer to a student who is ignorant of the principles on which the treatment is based. Particularly valuable, however, is the account which is given of Koch's researches into the strength of the solutions which are required to kill bacterial spores; and not less so the explanation which is given of why these spores do not develop in the tissues.

After giving a most detailed account of the mode of applying all sorts of antiseptic dressings, and carefully explaining each step in the operation, Mr. Cheyne gives a summary of the principal modes of wound-dressing which have found favour during the last few years, and shows conclusively that the value of each is in direct proportion to the nearness of its approach to Listerian principles. The explanation which is given of the reason why wounds of the face heal so readily, and why the discharge from an open wound is sweet, is at once ingenious and convincing. In conclusion, we can only hope that this book will meet with the reception which it deserves.

Clinic of the Month.

Insanity alternating with Spasmodic Asthma.—The relations of insanity to other diseases, especially by metastasis, are especially interesting as offering some possible clue to the physical conditions of the mind. Dr. Conolly Norman points out a relation heretofore little noticed, viz., the alternation of insanity with spasmodic asthma. Dr. Savage had noticed cases which he has very recently incorporated in his handbook on *Insanity*, and a rather doubtful case had previously been recorded by Dr. Kelp in *Zeitsch. f. Psych.*, 1872, xxix. 4. Alternation of insanity with gout has been described by Berthier, Savage, and others; with rheumatism by Griesinger and Clouston; with paroxysms of intermittent fever (sometimes replacing them), by Focke. Dr. Norman relates six cases all having one remarkable point in common, viz., a marked alternation in mental and asthmatic symptoms. Thus in the first case we have chronic asthma vanishing when insanity (acute melancholia) comes on, and reappearing when the mental trouble becomes chronic. In the second asthma cuts short, and takes the place of, an attack of insanity. In the third, perhaps the most remarkable and interesting of the series, habitual asthma disappearing, its place is rapidly taken by insanity (melancholia, with "imperative idea" in the patient to kill his mother), which again disappears rapidly on the return of the asthma in less than a month. When the last change occurred the patient was under close observation in an asylum, so that there can be no doubt as to the sequence of events. It would probably be carrying scepticism too far to say that the cure was due to the action of expectant attention in a patient already convalescent. In the fourth case, chronic asthma in an imbecile ceases with an acute attack of insanity (acute mania) and comes on again when the latter has passed off. In the fifth, the same order of things is observed as in the third. In the sixth, chronic asthma lessens in severity and finally disappears with the oncome of insanity (mania with delusions); when the mental defect becomes chronic with some degree of amelioration, asthma returns. A considerable similarity is to be seen between the mental symptoms ascribed by Dr. Savage to the form of insanity which alternates with asthma, and those of the insanity of phthisis. The actual resemblance of symptoms is less marked in Dr. Conolly Norman's cases. (*Journal of Mental Science*, April 1885.)

Resection of Ribs for Pyopericardium.—At a late meeting of the Verein Deutscher Aerzte in Prague, Prof. Gussenbauer exhibited a boy, 13 years old, in whom he had evacuated by thoracotomy the fluid of a pyopericarditis accompanying an acute osteomyelitis. The operation was successful, and the boy entirely recovered. The osteomyelitis resulted from a fall upon the right shoulder, which was followed by local pain and high fever, with great swelling of the shoulder and adjacent parts. A diagnosis of osteomyelitis was shortly made; and on the 3rd of May, fourteen days after the accident, the boy was operated upon. An incision at the infraspinous fossa was made, and was followed by the escape of pus, and the bone presented a grayish appearance. The operation was done with antiseptic precautions. The temperature did not fall as expected, but rose without any apparent cause. On the 20th of May, fluid was discovered in the left thorax, the heart was not noticeably displaced, and the intercostal spaces not obliterated. At first, a left-sided pleurisy was suspected, and an exploratory puncture showed a puriform exudation. The patient at last becoming cyanotic, an operation was decided upon, and five ribs were resected. It was then noticed that the intrathoracic fascia was not thickened, and further examination showed the effusion to be pericardial. The pericardium was then fixed to the edges of the wound to prevent escape of the fluid, on its evacuation, into the pleural cavity. During the operation, the heart could be seen and felt palpitating. The pericardium, after the withdrawal of the purulent contents, was washed out with a thymol solution. The following day there was marked improvement, the temperature fell at once, and complete restoration soon followed. (*Wien. med. Wochenschr.*, Nov. 21, 1884; *Med. News.*)

Non-parasitic Chyluria and Chylous Hydrocele.—M. Le Dentu, at the Société de Chirurgie, recently read a paper on the *filaria sanguinis hominis* and the pathogenic *rôle* of this parasite in fatty hydrocele, in which, after reviewing the history of the discovery and defining its limits, he refers to another class of cases in which no parasite exists. He concludes as follows:—(1) If it is demonstrated that parasitism is the real cause of a certain number of chylous effusions and of chyluria, without prejudice as far as other lesions are concerned it appears certain that the parasitic theory is not applicable to all cases. (2) To this special cause should be added others, of which some are due to a general cause (peculiar alterations of the blood), some purely local in their origin (ruptures or compressions upon any point whatever of the lymphatic system). (3) Such compressions, whether affecting the thoracic duct or the principal lymphatic trunks, act as partial or total obstructions to the glands, and produce either a transudation or rupture, and, unless absorbed, an accumulation of lymph either in the tissues or in closed cavities. (4) It is by obstruction of the glands, of the trunks and their branches, that the filaria causes all the disorders attributed to it. Treatment of the parasitic form is therefore rendered unsatisfactory, by the nature of the case. (*Philad. Med. Times,* Jan. 10, 1885.)

The Incubation-period of Small-pox.—M. Vinay, after the experience of a considerable epidemic of small-pox at Lyons, collects some interesting remarks upon its stage of incubation. Its duration was first estimated by Stoll in 1785 at six or seven days, but that was probably based on his observation of what followed inoculation such as was then practised; later observers give very wide limits, Rilliet and Barthez even from one to forty days; but several series of the most careful records agree in limiting the customary period of latency to twelve or fifteen days. M. Vinay is very strict in drawing his inferences from those cases only where he can prove that there was not more than one possible day of contagion. In eleven such cases under his own care the first symptoms were perceptible in two patients on the 11th day, in two on the 12th, and in the remaining seven on the 13th. Summing up from various sources the observations of other authors which satisfy strict conditions, M. Vinay gives a short table, of which the principal items are:—

Cases.	Day of invasion	Observer.	Reference.
18	12th—15th	Helmke	*Jenaïsche Zeitschrift,* 1866.
4	16th	Laboulbène	*Soc. méd. Hôpit.,* 1867.
9	7th—9th	Zulzer	*Berl. klin. Wochen.* 1872, p. 609.
10	11th—14th	Curschmann	*Ziemssen, Handbuch,* 1877.
11	7th—14th	Makuna	*Med. Times and Gazette,* 1877.

It should be remarked that all Zülzer's cases were hæmorrhagic, and their observer considers that their gravity was the reason of their remarkably short period of incubation, a position which Trousseau upheld in general terms, but for which M. Vinay can find no satisfactory evidence. From observations in hot climates it is likely that the period of incubation is shorter there, but M. Vinay declines to accept any statistics as accurate enough to be quoted. In conclusion he arrives at the following results: (1) The mean duration of the period of incubation is from eleven to twelve days. It appears to be shorter in the hæmorrhagic form, in which it is usually but six or eight days. But in the latter, the variations of duration do not bear any relation to the gravity of the disease. (2) Incubation is not prevented, nor its progress modified, by the presence of a preceding febrile disorder. Vaccination alone prevents or modifies the eruption of variola. (3) It is doubtful whether at this period contagion by simple atmospheric media can be caused, but the disease may now be transmitted by inoculations of blood or by vaccination. This last occurrence may result especially during an epidemic of variola. To prevent it, it is preferable to use only animal vaccine, and if it be impossible to obtain this, vaccination from arm to arm should not be practised. It is better to recultivate the vaccine, to keep the vaccinifer under observation, and not use the product within twelve or fifteen days. (4) Not only does vaccination prevent the development of small-pox when it is practised in season, but it also moderates the eruption—lessens it and renders it more benign, even when practised after variolous infection and during the incubation. Success is best assured when it has preceded the appearance of the variolous fever by a considerable number of days, and is almost *nil* within three or four days. When the fever has appeared, it is useless to resort to vaccination. Whatever the procedure—pricking, scarification, or subcutaneous injection—the progress and severity of the disease are not at all modified. (*Revue de Médecine*, Oct.—Dec. 1884.)

Naphthalin and the Decomposition of the Urine.—After discussing the changes which naphthalin undergoes in the alimentary canal, Rossbach points out its great use in preventing the urine from decomposing. One to two grains has so powerful an effect, that in a case of rather severe vesical catarrh the decomposition was almost completely arrested after two or three days. In slighter cases one or two days is sufficient to effect a complete cure. In the worst cases of tuberculous disease of the urinary tract, where the lungs were affected as well as the kidneys and bladder, five grains administered daily produced a very marked diminution in the number of bacteria, the sediment was lessened in amount, and the pain much relieved. (*Centralbl. f. Chirurgie*, p. 10, No. 1, 1885.)

Movable Liver.—A case is recorded by Maack in which a woman of thirty-five years of age, unmarried, complained of pains on the right side of the abdomen, which pains it appeared had been coming on for eleven years. A mass was discovered in the right iliac fossa similar in size and shape to the liver, which was absent from its proper place. It could be kept in position by a bandage. The cause of the floating liver appeared to be the presence of an old echinococcus cyst in the suspensory ligament. (*Centralbl. f. Chirurgie*, p. 63, No. 4, 1885.)

Laparotomy for Wound of the Stomach.—Dr. Tiling reports the following case: man aged nineteen years was stabbed in the abdomen a little above the navel in the middle line, and a piece of omentum protruded. Whilst the wound was being closed up, the patient vomited a considerable quantity of blood. Laparotomy was performed and a wound was discovered in the stomach along the greater curvature, with division of the gastro-epiploica artery: the artery was tied, and the wound sutured, but the peritoneum could not be cleaned out owing to the collapsed state of the patient. He made nevertheless a good recovery and took milk by the mouth on the fifth day. (*Centralbl. f. Chirurgie*, p. 48, No. 3, 1885.)

Galvano-cautery in Ocular Therapeutics.—At the late congress of ophthalmologists held in Copenhagen M. Nieden considered this subject in detail. He observed that the galvano-cautery was adapted to the diseases affecting the conjunctiva and the cornea and especially to those in which there was evidence of a mycotic origin, such, for example, as trachoma, conjunctival xerosis, rodent ulcer of the cornea, and scrofulous marginal ulcer. In such cases it effects complete disinfection, as is proved by the clean surface of the base of the ulcer and the improved tendency to heal which is exhibited immediately after its application, the aqueous humour at the same time becoming clearer, the iris dilating and any hypopyon that may be present undergoing absorption. It may, he thinks, in the majority of cases replace the operation of keratotomy, and if perforation of the cornea is required, the incandescent loop can effect the opening of the anterior chamber through the base of the ulcer with ease. The instrument possesses the great advantage that its application is attended with very little pain, that it can be employed without an anæsthetic, without a speculum, and without assistance. Out of eighty-three ulcers that had presented themselves to him one application of the galvano-cautery cured eighty-two, and three of these were rodent ulcer, and there was hypopyon in sixty-six. Ciliary neuralgia was rapidly dissipated. The duration of the treatment was 13·5 days for each case. (*Recueil d'Ophthalmologie,* p. 57, No. 1, 1885.)

Sodium Ethylate in Lupus.—At the meeting of the Medical Society of London, on the 8th inst., Mr. Startin showed several cases of lupus vulgaris which had been completely cured by the application of sodium ethylate. It will be remembered that Dr. B. W. Richardson drew attention to the value of this substance in the treatment of mucous polypi nasi in an early number of the *Asclepiad,* and it has now been employed with considerable success in a large number of cases of disease. In one of Mr. Startin's cases the lupus growth had involved the alæ of the nose and the adjacent cheeks to a considerable extent. Another case exhibited at the same time was almost entirely cured by erosion and careful scooping out of all the lupus tissue, only two operations having been required to effect the result. (*Medical Press,* Feb. 18, 1885.)

Labour and Child-Bed in Elderly Primiparæ.—Dr. F. Steinmann, of St. Petersburg, contributes to the *Archiv für Gynäkologie* (Band xxii., Heft 3) an article on the above subject. His method of investigating it is not the same as that of Dr. Kleinwächter (of whose researches we recently placed an abstract before our readers: *Pract.* xxxiii. 379). Dr. Kleinwächter compared the facts at his disposal relating to elderly primiparæ with those relating to younger subjects in the same clinic, and therefore under circumstances as nearly as possible identical. Dr. Steinmann compares the histories of elderly primiparæ at St. Petersburg with averages assumed to be true of labour in general. This method seems to us more open to objection than that of Kleinwächter; for exceptional features shown to be present in the St. Petersburg elderly primiparæ might be partly, at least, due to peculiarities in the patients, or in the working of that particular institution. Kleinwächter, by comparing patients of the same place and under the same conditions, differing only in age, seems to us to have worked on a method more likely to give correct results. With this explanation we put Steinmann's conclusions before our readers. It will be seen that in some important respects they agree with Kleinwächter's. (1) The only results that are comparable are those of authors who have collected their material in lying-in hospitals; figures based on private practice, out-door maternities, and published cases show exceptionally unfavourable results in elderly primiparæ; an exceptionally high percentage of mal-presentations and narrow pelves, and a correspondingly great frequency of operations, of morbidity, and mortality, maternal and infantile. (2) The proportion of elderly primiparæ is greater at St. Petersburg than at Marburg or Munich. (This, we think, illustrates our criticism.) (3) Twins are slightly more frequent than in other cases. (4) Transverse and pelvic presentations are somewhat more frequent than ordinary. Face presentations are rather less common, this being the contrary to what other statistics show. (5) Narrow pelves are more common than in other cases. (6) Operations are more frequent, especially the use of forceps, than in other cases, even with normal pelves; from which it would appear that weak uterine action is common. (7) Spasmodic contraction of the uterus and eclampsia are observed considerably more often than in other cases. (8) With increasing age of the primipara, rupture of the perineum is more frequent, and more seldom heals. (9) The morbidity is increased correspondingly to the increased frequency of complications shown in the foregoing, and elderly primiparæ are more liable to accidental intercurrent disease during childbed than others. (10) Consequently both the general and the purely puerperal mortality in them is increased. (11) Albuminuria and kidney disease are seen more often in elderly primiparæ than in others, both in pregnancy and in lying-in. (12) The mortality of the children of elderly primiparæ is nearly three times as great as that of others in the St. Petersburg clinic; this increase being mainly due to the large number of children dying during delivery. (*Med. Times*, March 28, 1885.)

Neurotic Muscular Atrophy.—In a recent clinical lecture Professor Charcot set himself the task of further subdividing the group of cases whose main characteristic is muscular atrophy. In the first place he proposes two main divisions according as the atrophy is dependent upon lesion of the spinal cord or takes its origin in the muscles themselves. To the first division belong lateral amyotrophic sclerosis, and true progressive muscular atrophy. In the second division he gives the first place to pseudo-hypertrophic paralysis, then comes Erb's juvenile form of progressive muscular atrophy, a disease which M. Charcot justly regards as having very close analogy with the above. Leyden's hereditary form of progressive muscular atrophy which usually commences in the legs, and Duchenne's infantile form of progressive muscular atrophy which, as a rule, makes its appearance in the face and especially about the lips, are not, in M. Charcot's opinion, really distinct diseases from the others, but may all be included under one title—primary progressive myopathy. Granting the correctness of this grouping, it remains for M. Charcot to show whether all these diseases originate in the same tissue, and if so, whether it is the muscles themselves that are primarily at fault, the nerve endings, or the vascular supply. (*Med. Times*, March 28, 1885.)

Extracts from British and Foreign Journals.

Abdominal Section in Spontaneous Peritonitis.—After discussing the question whether such a thing as "spontaneous" peritonitis is possible, Leyden passes on to the question of its treatment. The chief difficulty to be overcome lies in the uncertainty of diagnosis. Preliminary puncture which in many cases is so useful, affords in peritonitis no sure result. Leyden advocates incisions, washing out, and free drainage, and mentions several cases in which this treatment has proved successful. (*Centralbl. f. Chir.* p. 863, Dec. 20, 1884.)

Treatment of Perforating Ulcer of the Foot.—In an article on this subject, Mr. Frederick Treves draws attention to the following plan of treatment, which, in the two cases in which he has as yet tried it, may be considered to have met with a degree of success. On examining these ulcers it is obvious that the dense rigid ring of heaped-up epithelium that surrounds the sore or sinus forms a very grave bar to healing. The ulcer could never heal as long as its margin is set in an annular induration that prevents an approximation of its edges and an opportunity for the display of the healing process. Even if the ulcer were to become filled up with granulations its final closure would still be a matter of considerable difficulty, since the skin, that takes so active a share in the healing of such lesions, would be seriously hampered in its activity. The plan alluded to is this: The patient is confined to bed and the sole of the foot is kept continuously poulticed with linseed meal. This causes the epithelium to soften and swell up, so that at the end of twenty-four hours the ring around the sore appears as a very prominent softish white mound. All this redundant epidermis is then shaved away with a scalpel, and the poultice is reapplied. At the end of another twenty-four hours the deeper layers of epithelium that were not affected by the first poulticing have become swollen and prominent. They are in turn cut away. The poultice is again applied and the scalpel used day by day, until the whole of the epidermic mass has been removed. This object will be effected at the end of about ten or fourteen days.

By this time the skin about the ulcer will, as a result of the continued poulticing, have peeled off in a thick white layer, and around the sore will be nothing but thin fresh pink epidermis, looking active and healthy. The ulcer in the meantime will be found to have cleaned, and by the loss of its cutaneous boundary will appear less deep. The poultices are now discontinued, and to the sore is applied a paste, of the consistence of thick cream, composed of salicylic acid and glycerine, to which is added some carbolic acid in the proportion of ten minims to the ounce. This paste is applied on lint, and is quite painless. The ulcer soon heals, and when the patient gets up he is instructed to wear a thick pad of felt plaster over the spot, with a hole in its centre that corresponds to the scar of the recent sore. This plaster should be always worn. As one objection to this measure it may be urged that, although pressure may be taken off on one part of the sole, an ulcer may appear at some other spot where pressure has effect. As far as the two cases go, this result has not yet happened; and it is to be noted that, although a large area of the sole is normally exposed to pressure, these ulcers have a tendency to appear only in certain spots. The patients should also be instructed to pay great attention to the cleanliness of the feet, and to wear well-fitting woollen stockings and easy boots. (*Lancet*, November 29, 1884.)

Consequences of Extirpation of the Thyroid Gland.—Wagner's experiments were undertaken with a view to clear up the connection between the thyroid and the nervous system. For this purpose thirteen cats and two dogs were employed. In two, one half only of the gland was removed, whilst in the remainder the whole was extirpated. The latter all died, whilst the remaining two, in which only half was extirpated, recovered and enjoyed good health till the remaining halves were removed, after which they speedily died. Wagner draws attention to the mode of death, showing that the animals were at first quite well and lively, but began to sicken after a few hours, and usually died in less than four days, after suffering from muscle cramps, epileptiform seizures, in some cases from tetanic spasms. The author draws attention to the analogy which is seen between such a mode of death and that which occurs after extirpation of both kidneys, when the animal dies of uræmia, and he suggests that death is due to the lack of excretion of some substance which, when retained in the body, acts as a violent poison. (*Centralbl. f. Chirurgie*, p. 860, Dec. 20, 1884.)

High Temperature in Chlorosis.—Dr. Humbert Mollière recently communicated to the Lyons Society of Medical Science the results of two years' assiduous observations on the body temperature of chlorotic patients. The temperature was carefully taken in the rectum in thirty cases, all in which there was any reason to suspect tuberculosis being excluded. The observations were made either just before the hour of sleep or in the forenoon, no unusual exercise being allowed. He found that the mean temperature curve oscillates constantly between 37·8° and 38·8° C. (100° and 101·8° F.) so long as the symptoms of the affection persist, sinking about 1° C. as they decline. In slight cases the curve does not run so high as in graver ones. Another remarkable observation was that every now and then unmistakable febrile exacerbations appear unaccounted for by any intercurrent disorder such as tonsillitis, cold, or menstruation. The rise may reach 39° C. or in rare cases 40° C. (102·2° to 104°F.), and may last one or two days. The writer remarks that these facts justify the old name of *febris alba virginum* formerly given to the affection, and suggest that the ancients were perhaps keener observers of its phenomena than we. Dr. Mayet of Lyons and Dr. Moore of the Sussex County Hospital have confirmed Dr. Mollière's results. (*Journal de Médecine de Paris*, Jan. 10, 1885.)

Fever and its Treatment by Cold Water.—Professor B. Naunyn in a recent article calls especial attention to the experiments of Liebermeister and Jürgensen, which, in spite of their one-sided character, have received very general recognition. Naunyn draws a sharp line of separation between the danger of increased temperature, and the severity of the disease causing it, of which fever is only a symptom. He has experimentally studied the dangers of over-heating the organism, where there is no general disease, by placing rabbits in a specially constructed apparatus. The result of these experiments was that completely healthy normal rabbits bore a temperature of 107·6° Fahr. for from one day to one week, and for the most part without injury; but that a temperature of 108·5° or 109·4° Fahr. was dangerous and fatal. He leaves out of his discussion insolation and intense hyperpyrexia, for which he advises prompt treatment with cold water. In discussing the febrile diseases, pneumonia, typhoid fever, relapsing fever, scarlatina, &c., he concludes that the high temperature is absolutely of no moment as an element of danger. A very clear example is seen in relapsing fever in which, as is well known, high temperature is the rule; this reaches a degree seldom seen in other diseases, and may persist for a long time without injury to the patient, and is not usually considered dangerous by physicians. So also in typhoid fever in which low temperatures are observed (seldom over 102·2° Fahr.), but these accompanied by severe general disturbances, the patient recovers more slowly and with more difficulty than from cases which are similar except as regards the presence of higher temperature. The same is seen in other acute febrile diseases. Naunyn thinks, however, that observations as to the temperature in febrile diseases are of more importance as a rule than those of any other single symptom, especially since we have no such certain means of measuring other symptoms as by the thermometer in abnormal temperature. Naunyn cannot regard Liebermeister's definition of fever as correct. We have no right, he thinks, to regard the functional disturbances which take place in single organs during fever as the consequence of the fever. Fever is a symptom, with which the other pathological phenomena, such as disturbances of the nervous system and of the circulatory apparatus, and nutritive changes, occur as co-ordinate symptoms, and the occurrence of all these single symptoms is the acute affection. He has also made extensive researches in the acute infectious diseases as to the nutritive changes, the changes of the blood, the circulatory disturbances, and those of the organs of secretion. In these he was assisted by Dr. Minkowski, who, in examining the blood of fevered dogs, found no constant changes in the blood cells. But he found in the same blood an abnormal acid—fermentable lactic acid. Naunyn also made experiments on the excretion of urine and on the occasional presence of carbonate of ammonium in fevered persons. In one case of petechial typhus, he found, on the second day after the crisis, ninety-one grammes of urea, and in a second case, on the third and fourth days after the commencement of the fever, one hundred and sixty grammes. Nothing conclusive was found as to the presence of carbonate of ammonium in the blood. After discussing the nature of the febrile process, Naunyn discusses the grounds upon which he recommends the cold-bath treatment of fever, and the rules by which one should be guided. He restricts the cold-water treatment (except in cases of insolation and intense hyperpyrexia) entirely to typhoid fever, as statistics have not yet shown that it has a favourable influence upon the course of other acute febrile diseases. But other antipyretics, as salicylate of sodium and quinine, never act so well in typhoid fever as the cold-water treatment. The rules which he gives for this treatment, in the course of typhoid fever, are mainly as follows: He prescribes complete baths only, dividing them into: (1) cold baths, between 72·5° and 81·5° Fahr.; (2) lukewarm, between 81·5° and 90·5° Fahr.; (3) warm baths, between 90·5° and 95° Fahr. Typhoid fever patients should be placed in the bath, as a rule, as soon as the temperature in the axilla reaches 103·1° Fahr. The frequency of the baths should depend upon the temperature of the patient. The temperature should be taken every three hours, and a bath given. Baths of 77° Fahr. are most frequently used at first, and then of 83·2° or 86° Fahr., but never under 72·5°. The patients should be bathed at night as well as during the day. The cold bath should last from five to ten minutes, the lukewarm from ten to fifteen, according to the susceptibility of the patient. After the bath warm wine or grog should be given. If baths at these temperatures have no favourable effect, and the patient cannot be warmed and shows symptoms of collapse, the bath should be 4° or 5° higher. If the temperature does not fall sufficiently with baths of this temperature, or if it soon rises again after the bath, the water may be made somewhat cooler, or the patient may be bathed oftener, and before the temperature reaches 103·1° Fahr. In severe cases of typhoid fever, with low temperature and pronounced general symptoms, the patient may be bathed with advantage if the axillary temperature reaches 102·2°. In some cases also, cases of violent delirium, warm baths may be given between the cold ones, generally in the afternoon between 6 and 8 P.M. The influence of these warm baths is, as a rule, very good. In connection with the bath-treatment, Naunyn places great reliance upon a careful dietary regimen. (*Arch. f. exp. Path.* 1, 2, vol. 18.)

Contraction of the Field of Vision in Epilepsy.—The anæsthesia which manifests itself as a concentric contraction of the visual field, and which is frequently associated with disturbance of the cutaneous sensibility and of the special senses, has hitherto been regarded as almost characteristic of hysteria. Thomsen made a systematic perimetric examination of twenty-eight male and fifty-one female patients in the department for the insane and epileptic in the Charité, and discovered that sensory anæsthesia occurs not alone in hysterical patients, but also in epileptics, and in a connection with the epileptic attack which, under certain conditions, may be regarded as the rule. When the attack is a purely motor convulsion, that is, when no disturbance of consciousness or emotional disorder is combined with it, the field of vision is not contracted, but has the same normal extent after the attack as before. On the other hand, concentric contraction of the visual field, either with or without disturbance of cutaneous sensibility, of the functions of the other special senses (hearing, smell, taste), and of the muscle sense, is found after, or with, the following conditions: (1) After an epileptic attack when delirium with hallucinations follows it. (2) After post-epileptic mental bewilderment, stupor, so-called epileptic mania, &c. (3) After almost all similar conditions, with or without disturbance of consciousness (attacks of dread and oppression, sudden waking at night with spasmodic sensations, wetting the bed, so-called motory or sensory aura, &c). (4) With more lasting post- or inter-paroxysmal conditions, which leave consciousness intact, but are attended by emotional depression and excitability. The patients are dejected in spirit, their psychical balance is unstable, they complain of all sorts of nervous sensations (palpitation, trembling, flushes of heat, ringing in the ears, glimmering before the eyes, persistent headache, and sleeplessness). All these conditions produce narrowing of the visual field; with their disappearance it again enlarges gradually or rapidly (it may be in twenty-four hours) to its normal dimensions. The contraction of the field is always concentric, never hemianopic, but is often much more pronounced on one side. The concentric contraction is associated generally, but not always, with diminished acuteness of sight. The cause of the epileptic attacks, which are attended by contraction of the field, is, in all probability, to be sought in a disturbance of the circulation of the cerebral cortex, which only gradually passes off, while with the pure motor attack the disturbance disappears immediately. That the cortex is the part affected is shown by the constant implication of the psychical functions. (*Berl. klin. Woch.* 27, 1884.)

Oil of Cade.—Dr. Amory, who has recently visited the Department of the Var, in Southern France, where the *huile de cade* (*oleum cadini*) so much employed there in cutaneous affections, is distilled from the *Juniperus oxycedrus,* read a paper at the Suffolk Medical Society giving some account of its production. It is distilled in rude earth ovens by the peasantry, and sold to the merchants without having undergone any purification, from Toulon, Marseilles, and especially Nimes, which is its chief centre of distribution. It has long been known as an efficacious sheep-wash. It is too cheap to tempt adulteration, but there is no test of its purity known. Its advantage over the oil of tar would seem to consist in its somewhat less disagreeable smell. (*Boston Medical and Surgical Journal,* Dec. 11, 1884.)

Inert Foreign Bodies and Tuberculosis.—When Koch first announced to the world his discovery of the tubercle-bacillus, and gave an account of the experimental evidence which had convinced him of its essential etiological relation to the disease tuberculosis, it was natural that conservative physicians should demand additional evidence and confirmation from other sources before accepting his conclusions, notwithstanding the reputation which he had already established as an expert and conscientious investigator. Hence Dr. George M. Sternberg was led to study the *modus operandi* of the bacillus in producing tuberculosis, and ascertain whether its pathogenic power resulted from its simply acting as a mechanical irritant or depended upon specific physiological characters peculiar to it. His investigation was made in the biological laboratory of the

Johns Hopkins University. He injected into the peritoneal cavity of a number of rabbits thoroughly sterilised powdered glass and marine blue, taking every precaution to avoid the dangers and possibilities of accidental infection, and the results gave no support whatever to the view that tuberculosis may be induced by the presence of finely powdered inorganic particles, or to the view that the tubercle-bacillus induces tuberculosis by acting simply as a mechanical irritant. (*Amer. Journ. Med. Sciences,* Jan. 1885.)

Preservation of Chloroform.—Professor Regnauld communicated to the Société de Biologie, at its meeting on November 15th, the results of the prolonged researches which he has been engaged in as to the preservation of chloroform. From these it follows—(1) that if absolutely pure chloroform be exposed to solar light, whether direct or diffused, it gives the first indication of decomposition after two days during the high temperatures and intense radiations of July, and only after five days in December; (2) the same chloroform may be preserved pure in contact with the air for more than fifteen months, on the condition of its being scrupulously kept away from solar radiation; (3) the same chloroform, exposed alternately to direct or diffused solar light, may be preserved for more than fifteen months, on the condition of its remaining in contact with an azotised atmosphere completely deprived of oxygen; (4) it has been an error to attribute the changes which take place in chloroform to the presence of a certain amount of free chloral; the oxygen of the air suffices to produce them when the mixture of this gas and the vapours is exposed to insolation; (5) chloroform may be preserved unchanged, even when submitted to the simultaneous influence of air and light, by the addition of a hundredth, a five hundredth, or a thousandth part of ethylic alcohol; (6) the intervention of ordinary ether ($C^4H^{10}O$) also proves entirely efficacious, since a thousandth part suspended the action of oxygen and light during several months (from April 4th to November 15th, 1884). (*Med. Times,* February 28, 1885.)

Carbolic Acid in Purulent Affections of the Conjunctiva and Cornea.—Dr. G. Herbert Burnham, of Trinity University, Toronto, strongly recommends the use of a 5 per cent. solution of carbolic acid in gonorrhœal ophthalmia, especially in those cases of deep and transparent excavation of the cornea which are so often followed by perforation and prolapse of the iris. It is equally useful, he thinks, when there is much serous chemosis and swelling of the ocular and palpebral conjunctivæ, where œdema is so great as to render the eyelid hard and dense, and in cases where the conjunctiva of the eyelid is so loaded with exudation as to give the brawny mottled aspect of diphtheritic ophthalmia. He finds it less serviceable in cases of deep circumscribed infiltration of the cornea with the external surface unabraded. The course he pursues in the treatment of a case of gonorrhœal ophthalmia is to keep the patient in bed, to place a large basin of ice-cold water by his bedside, with which the eyes are frequently bathed, whilst a pledget of lint dipped in it is kept on the closed eyelids. The 5 per cent. carbolic acid lotion is introduced between the lids every hour. After some time, as the discharge diminishes, the strength of the lotion is reduced to 2½ per cent., which is continued till the discharge ceases. (*American Journal of Ophthalmology*, Vol. i., No. 8, 1884).

Chronic Bronchitis in Children.—In the *Progrès Médical*, Nos. 50 and 51 for 1884, Dr. Comby contributes a paper on this subject. His contention is that in children chronic bronchitis may be produced as a sequel of measles or whooping-cough, or may be started independently from a mere cold. He considers that it differs essentially from the chronic bronchitis of old people in that it hardly ever leads to emphysema and dilatation of the heart, which are the almost invariable concomitants of the disease in those past middle life. (In this point we do not find ourselves able altogether to agree with Dr. Comby, and cannot but think that his conclusions have been drawn from an insufficient experience. Emphysema, though far from common in children, is by no means unknown, and when it is set up, it is, so far as our own observation goes always followed by cyanosis and dilatation of the heart as in old people). It is noteworthy how very little the general health of the children is affected. They run about and play as usual, they rarely suffer from dyspnœa, and their cough troubles them but very little. Dr. Comby notes that it occurs only or almost exclusively in children who have already manifested signs of the scrofulous diathesis, or who have sprung from a scrofulous stock. The chief danger of the affection is that it renders the children more susceptible to such diseases as measles and whooping-cough, and on that account he strongly urges that children suffering from chronic bronchitis should not be allowed to attend at the hospitals until they have passed through the infectious diseases. Children who suffer from chronic bronchitis are more liable to pulmonary tuberculosis than other children, and this constitutes the reason why early treatment of this malady is so important. (*Med. Times*, Feb. 7, 1885.)

New Antiseptic Dressing.—M. Marc Sée has devised a convenient form of antiseptic dressing. Before applying the sutures, he is careful to arrest all bleeding, first by means of catgut ligatures, and afterwards by dusting the surface of the wound with sub-nitrate of bismuth powder. When all oozing has ceased, he brings into accurate apposition the deep and superficial parts of the wound by means of catgut sutures; where drainage tubes are used, these are of red india-rubber. The wound, having been once more dusted with powder of bismuth, is covered with a pad of carbolised cellulose, within which there is a certain quantity of corrosive sublimate. The whole is held in position by a gauze bandage, over which there is a bandage of india-rubber. The drainage tubes are withdrawn at the end of three or four hours, and the dressing is not removed oftener than every fifth day for three weeks, by which time the healing process is usually complete. (*Progrès Médical,* January 10 1885.)

Incompatibility of Sulphate of Quinine and Potassium Iodide.—Rabuteau, in the *Union Pharm.*, 1884, shows that the sulphate of quinine administered with the iodide of potassium causes anorexia, nervousness, and general malaise. These effects are analogous to those occurring if an iodide containing iodate of potassium is taken, the acid of the gastric juice in this case liberating free iodide. According to Rabuteau, the same result obtains with a mixture of iodide of potassium and sulphate of quinine, and the liberated iodine is the cause of the observed disturbances. He further observes that very serious or even fatal results may occur from this cause during menstruation. (*Gazzetta degli Ospitali*, Jan. 4, 1885.)

Notes and Queries.

DENISON'S CLIMATIC MAP OF THE UNITED STATES.—Dr. Charles Denison, Professor of Diseases of the Chest and Climatology, University of Denver, Colorado, has sent us a copy of his *Seasonal Climatic Map of the United States.* It is a marvel of perspicuously condensed meteorological information. On one sheet five maps illustrate, by means of isotherms, differential shading, and other devices, the distribution of temperature, dryness, cloudiness, wind, &c., for the four seasons of the year and for the whole year taken together. A multitude of accessory tables give the numerical data for the chief stations. Not only to American physicians, but to those in this country whose attention has been directed to American health-resorts, and to meteorologists generally, Dr. Denison's laborious and ingenious graphical generalisations must have a high interest.

THE SEI-I-KWAI, OR SOCIETY FOR THE ADVANCEMENT OF MEDICAL SCIENCE IN JAPAN.—We have received from Japan the January and February numbers of the Transactions of this young society, published in English and Japanese. They contain several interesting and highly creditable papers, together with the following statement, which we have much pleasure in reprinting. An appeal is made on behalf of the Library for copies of journals or other publications containing articles relating to medical affairs in Japan, Korea, and China. They may be sent through Mr. John Tod, care of Messrs. Samuel Harris and Co., 37, Bishopsgate Street Without, London, E.C.

"At a recent meeting of the SEI-I-KWAI at Tokio, it was decided, with the object in view of furnishing a brief review of Japanese medicine, and to encourage the use of English among its members, to add to each part of the Transactions of the Society in Japanese, beginning with the present part, a supplement in English, containing translations of articles of interest read before the society, or published in the Japanese Medical Journals, together with brief notices of reports, and new works in Japanese, appearing and relating to medicine. This Society was founded in January, 1881, having for its general object, as its name signifies, the advancement of medical science in Japan, and especially the establishment of a Medical Museum and Library, and the erection of a building for the same, equipped with apparatus, etc., for the purposes of the society.

"Since its foundation, and up to the present time, there have been held one hundred and fifty-eight meetings, at which one hundred and thirty-one clinical cases were exhibited, some of which were very interesting and instructive. The meetings are held every Wednesday between 7 and 9 P.M.; and at the ordinary meetings, reports on clinical cases are made, lectures given, and interesting extracts from foreign medical papers read. Discussions take place on clinical cases, which are exhibited half an hour prior to the opening of the meeting. A special discussion takes place once a month upon a certain subject selected a month in advance. The society at first consisted of only twenty-two members, but now its members are eighty-six in number, including seven foreign members."

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⁂ Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Baillière, of King William Street, Charing Cross.

Department of Public Health.

THE RESULTS OF THE NOTIFICATION OF INFECTIOUS DISEASES.

(*Continued from p.* 315.)

Leicester (Leicestershire).—Population 122,376 in 1881. Compulsory powers adopted in 1879. Notification to be given both by the medical practitioner in attendance and also by the occupier, whether a medical practitioner is in attendance or not. The diseases to be notified are: small-pox, scarlatina, diphtheria, typhus, enteric fever, puerperal fever, erysipelas, and "infectious cholera."

In answer to the circular letter of the Local Government Board, of 3rd April, 1882, the town clerk wrote as follows:—

"In reply to your inquiry of the 3rd instant, I beg now to furnish you with the following information, dealing with the inquiry *seriatim*:

"*First*, as to whether we are satisfied with the provision in our local Act:

"The reply is, Yes, thoroughly satisfied with the principle of notification. We had long felt the need for early information, and we are quite satisfied that since we obtained the power we have avoided, or rather stamped out at the very commencement, what would otherwise have proved small-pox epidemics. I may say a scarlet-fever epidemic existed extensively at the time we obtained the power, and this has continued almost down to the present time. There are, however, in connection with the provision some matters of detail which, if we were now applying for our powers, we should vary to some extent, and seek to guard ourselves against there being an abuse, as we think, of the provisions by one or two medical men.

"*Secondly*, as to any suggestion we may desire to make:

"I beg to say that our experience is that erysipelas should either be omitted from the list, or the term should be in some way qualified, say by the term 'phlegmonous,' *i.e.*, 'phlegmonous erysipelas.' It will be observed from a sample of half-a-dozen cases reported upon by the sanitary inspectors[1] the notification of this disease is capable of abuse, and every member of the profession cannot be relied upon not to abuse it, though we should certainly like it to be understood that we are satisfied the large majority would not think of unduly straining the provision.

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[1] In one case a man had burnt his hand, and the doctor told him "to be careful or he would have erysipelas." In another a woman ran a pin into her hand and "the wound festered."

"With regard to 'cholera,' I beg to say we had intimation during the passage through Parliament of our Bill that cases of diarrhœa (which I may say is unfortunately an extensively epidemic disease here in the summer months) could, and probably would, be reported under this head. We therefore sought to have the word 'Asiatic' prefixed, but Lord Redesdale preferred the term 'infectious.' There has under this been unpleasantness with one medical gentleman (an active opponent to our Bill), who returned a case of infectious cholera. We did not, however, pay the fee. With this exception, and excepting also that we made a 'firm stand' against payment for the cases of erysipelas as set out in the list enclosed, and challenged legal proceedings, the provision has worked remarkably well and smoothly.

"Mr. Lankester, surgeon, who was secretary of the local medical association here at the time we obtained the power, and was not then a member of the town council, but has since become a member, has, as I have pleasure in stating, frankly admitted repeatedly that there was unnecessary alarm on the part of the medical profession. I enclose an extract from a newspaper report of the proceedings of the last quarterly meeting of the council, from which will be observed a full confirmation of what I state respecting Mr. Lankester." . . .

In his annual report for 1879 Dr. William Johnston, medical officer of health for the borough, gives the death-rate from all causes as 21·1, and that from the principal zymotic diseases as 2·8 per thousand. Referring to the subject of the notification of infectious diseases he writes:—

"In my report for 1877 I brought under the notice of the Sanitary Committee of Leicester the clauses of the Bolton Improvement Act, 1877, relating to compulsory registration of infectious diseases. The committee, in considering the report, thought it desirable that powers similar to those of Bolton should, if possible, be obtained from Parliament for this town, and determined, in their next Improvement Bill, to include clauses asking for a similar authority to be conferred. In the Leicester Corporation Improvement Bill, 1879, clauses seeking for such powers were accordingly introduced. This evoked a strong opposition on the part of the medical profession of the town, and they petitioned Parliament against the clauses, the chief objections raised being that the provisions 'imposed upon them new and onerous and unnecessary obligations'; that these obligations were 'inquisitorial in character, uncalled for, and likely to lead to endless mischief and complication.' On May 23rd, 1879, after hearing the evidence for and against the granting of the power sought for, the Parliamentary Committee, after a short deliberation, considered the preamble of the Bill as proved, and the Act came into operation on September 13th.

"Scarlet fever was at that time epidemic in the town, and, from the greatly increased information obtained under the newly-acquired provisions respecting cases suffering from the disease, conditions were everywhere found to exist among the classes affected which favoured, to an eminent degree, the spread of the malady. Children from infected houses were frequently sent to school; mothers of families free from the disease were often found visiting the infected houses of their neighbours; hosiery goods were being made up by mothers as they nursed children suffering from malignant forms of scarlet fever; and in scores of families no attempt at all had been made to isolate the sick from the healthy. The inspectors, on visiting the reported cases, succeeded in removing to the hospital a much greater number of cases than hitherto, and where the disease was found to exist the people were cautioned against sending their children to school. The School Board authorities were also apprised of the danger, and requested to exercise greater caution in admitting children from houses where sickness existed. In short, wherever circumstances were found to favour the spread ot the malady immediate action was at once taken either to correct, or limit as far as possible, their influence. A most important result of these proceedings was that the people themselves became more alive to the dangers attendant upon the complaint, and in consequence were led to adopt greater precautionary measures. Judging from the records of previous epidemics of scarlet fever, a decided limitation in the fatality from the disease was, after a time, observable, notwithstanding that it had gained an epidemic prevalence before the provisions of the Act came into operation. Abundant proof brought about in the mortality will be found under 'scarlet fever.' . . .

"With respect to the obligations being 'likely to lead to endless mischief and complications,' the reply is simple and lies in the fact that, from the time when the provisions of the Act first came into operation up to the present time o writing (which embraces a period of over six months), not a single complaint has reached the ears of the sanitary authority from either the general public or the medical men themselves of any mischievous result or complication having arisen from their compliance with the newly-imposed duties. Up to the 31st December, 1879, the cases reported on were: of scarlet fever, 496; typhoid fever, 56; erysipelas, 125; diphtheria, 24. These cases existed among all classes of the population, and, if any just ground of complaint had appeared, I feel satisfied that the authorities would soon have been communicated with. I think that the fact of no friction having occurred in the working of the clauses in Leicester undoubtedly shows that the objections and fears at first entertained in regard to the probable issues of compulsory registration of disease were alike groundless and illusory. This being so the question naturally arises whether or not the medical attendant or the householder should be required to give information. I have watched with the deepest interest the working of the powers in the town from the commencement, and my opinion is, that *the medical man and the householder should be responsible for the reporting of the cases.* Where such a glaring lack of precaution as already described existed among the people, favouring as it did the spread of contagion of any kind, it will, I think, be admitted that the obligations imposed upon the medical faculty in Leicester for the compulsory registration of infectious diseases occurring therein, were neither 'unnecessary' nor yet 'uncalled for.' I do not deny that the obligations are new, and, to a limited extent, inquisitorial in character, but upon these grounds objections to them cannot fairly be raised. During the last twenty years the mind of the profession has been much enlightened with respect to the intimate nature and mode of spread of these infectious diseases; numerous fresh channels for their transmission have also been brought to light, while the risks of infection among children have been considerably multiplied since education was rendered compulsory. Under such altered circumstances an evolution of fresh obligations, together with a slight change in those already in force, should not meet with opposition from medical men, so long as it can be shown that, by their fulfilment of the new duties, medical interests are in no way encroached upon, while numbers of human lives may be annually saved and much bodily suffering averted."

The admissions into the borough hospital in 1879 were 269 in number, namely, 247 scarlet fever, and twenty-two erysipelas. Enteric fever is admitted into a special ward of the general infirmary, and hence the sanitary authority find no necessity to receive such cases into their isolation buildings. From a table embodied in the report it would appear that of the 247 cases of scarlet fever isolated in hospital eighty-four were removed to hospital in the nine and a half months before the new Act came into force, and 163 in the three and a half which followed on the system of notification. This is specially noted by Dr. Johnston as "satisfactory" in connection with the working of the Act, but it must be remembered that elsewhere he explains that the disease only "became epidemic in prevalence towards the end of July and the beginning of August." Speaking next as to the fatality of scarlet fever, Dr. Johnston considers that the record of deaths after the Act came into operation affords "an unmistakable sign of a successful interference with the future spread and development of the disease." The disease in 1879, being acknowledged by the medical men to have been fairly comparable, so far as type is concerned, with the epidemic of 1875, exhibited a "limitation of fatality" in the 1879 epidemic, which "may fairly be accepted as the direct resnlt of the more extensive measures of prevention taken by the health authorities immediately they received prompt information of the existence of fresh cases." A comparison is then instituted between the deaths from scarlet fever during the last fifteen weeks of the years 1875 and 1879:—

> "The deaths registered during this period of 1879 were 66; the number in the corresponding interval of 1875 amounted to 94; but (with the same imperfect means for prevention) if the increase of population be taken into account, these deaths would have increased to 107 in 1879, showing an increase of 41 upon the actual deaths recorded.
>
> "The number of certificates of scarlet fever sent in during the same fifteen weeks of last year (1879) was 496, and referred to 467 different habitations; this number, when divided by 66 (the number of deaths), shows that one death took place among every seven houses visited with the disease. The probable result that followed the increased vigilance of the health authorities during the fifteen weeks of scarlatinal prevalence may therefore be briefly summarised as follows:—no less than 41 lives were saved to the town from the disease, and 287 homesteads were preserved from an invasion of this dire and fatal malady."

The annual report for 1880 gives the general rate of mortality as 24·7 per thousand living. The deaths registered from the "miasmatic order" of the zymotic class of diseases numbered 830, and included 13 deaths from "croup," 11 from erysipelas, 8 from puerperal fever, together with 779 fatal cases returned under the seven principal zymotic diseases; these latter including measles 166, scarlet fever 119, diphtheria 23, "fever" 46, and diarrhœa 398. The zymotic death-rate was 6·5 per thousand.

The following were the numbers of certificates received and of cases isolated in hospital:—

Diseases.	Scarlet fever.	Erysipelas.	Typhoid fever.	Diphtheria.	Puerperal fever.	Small-pox.	Typhus.	Total.
Number of certificates	802	412	245	87	6	—	—	1,582
Admitted into isolation hospital	230	47	*	—	—	1	—	278

* This disease is received into special wards at the general infirmary.

Referring to the 119 deaths from scarlet fever Dr. Johnston explains that ninety-two occurred in the town and twenty-seven in the borough fever hospital which lies outside the municipal boundary. The number of certificates of this disease received during the year from medical men was 792. He then proceeds:—

> "On looking back to the returns in 1879, I find that the scarlatinal deaths registered in the last quarter of that year were 57, and the number of certificates received (representing scarlatinal prevalence) in the same interval was 382. A comparison of these figures with those just given for 1880 shows that the health authorities of the town, acting on the early information they received of any fresh *foci* of the disease, succeeded largely in limiting its spread. Further evidence of this limitation may be gleaned from the following table, which, forming a sequel to a similar one given in my report for 1879, supplies comparative information with respect to the fatality caused by the epidemic of 1876 and that of last year. From the table we observe that the deaths in 1880 were fewer by 61 than in 1876. So marked a decline in mortality, notwithstanding the great increase in population, must be regarded as eminently satisfactory. It is also gratifying to observe the increase in the hospital admissions last year over the number admitted in 1876, for the reduction in the deaths in 1880 was no doubt owing to the fact of more parents having availed themselves of the means thus provided for the isolation of their infected children."

He next refers to the extent to which the disease was spread by the school attendance of convalescents. The school examinations were being held, and parents became anxious for their children to pass the required "standards."

> "Anxious to limit, as far as possible, the spread of infection which these attendances from the infected houses gave rise to, the Sanitary Committee, through their officers, at once apprised the school authorities of the fresh instances that came to their knowledge. Towards the close of the year the Committee also caused two notices to be printed for delivery to schoolmasters. The following is a copy of the first notice, which is printed on *red* paper:
>
> > "I beg to inform you that a child named residing at Street, is suffering from scarlet fever, and therefore children from this house should not be permitted to attend school until a notice is received from either the medical gentleman attending the case or myself, that the house is free from infection.
> >
> > ____________________, *Sanitary Inspector.*
>
> "In each fresh case of scarlet fever reported on, the above notice is sent by post to the master of the school where the children have been attending. The second notice, printed on ordinary *white* paper, contains the following:
>
> > "I beg to inform you that the house, Street, is now free from infection, and the children may be again permitted to attend school with safety.
> >
> > ____________________, *Sanitary Inspector.*
>
> "When the case of scarlatina has completely recovered, and the house has been thoroughly disinfected by fumigation, the second notice is forwarded to the school teacher."

Apart from these extracts there is nothing in the report bearing specially on the compulsory notification of infectious diseases.

During the year 1881 the general rate of mortality was 21·6 per thousand living. There were 548 deaths from diseases belonging to the class known as "principal zymotic diseases," and these included small-pox 2, measles 7, scarlet fever 184, diphtheria 11, fever 29, and diarrhœa 193; the annual rate from the principal zymotic diseases being 4·45 per thousand. There were also 10 deaths from erysipelas, 12 from puerperal fever, and 4 from "croup."

The number of certificates received and the number of cases isolated in hospital were as follows:—

Diseases.	Scarlet fever.	Erysipelas	Typhoid fever.	Diphtheria.	Puerperal fever.	Small-pox.	Typhus.	Total.
Number of certificates	1,065	566	179	63	15	4	—	1,892
Admitted into isolation hospital	393	42	*	—	—	6	—	441

* This disease is received into special wards at the general infirmary.

Referring to the sustained prevalence of scarlet fever in the borough the report states :—

> "155 deaths were registered in the borough from this disease ; to these must be added 29 cases which proved fatal in the fever hospital, showing the total deaths in the year to have been 184, a number exceeding by 65 the fatality in 1880.
>
> "This increase in the deaths from scarlet fever, notwithstanding the extensive use made of the hospital during the year, is, to say the least, very unsatisfactory. No one can doubt but that the frequent visitations of the inspectors to the houses where the disease appeared, to ascertain the sanitary state of the dwellings, as well as to caution the parents from visiting the houses of their neighbours and from sending their children to school, must have exercised a beneficial effect in awakening the people to a fuller sense of the dangers of the disease. The reduction in scarlatinal fatality that might reasonably have been expected to follow on this increased vigilance of the inspectors has, however, not been realised, and the reason for this is not difficult to find. During the year 1,045 houses were certified by the medical men to have been visited with scarlet fever. In only 388 of these instances did the parents consent to the removal of their children to the hospital, leaving 657 houses in which and from which the disease was allowed, practically speaking, to run its course unimpeded. I say that in these cases the disease ran its course unimpeded, for the great majority of them were in houses of the artisan class, having from two to six rooms, and the scanty space which such dwellings can afford, together with the inability of the parents to provide a separate nurse for the sick, render it quite impossible either to properly isolate the sick, or to prevent the extension of the disease to other houses in the locality. We can only hope that in time parents will avail themselves more widely of the advantages to be gained by having their sick children removed to the hospital, where, under skilful nursing, proper diet, and pure air, their chances of ultimate recovery are undoubtedly much increased."

In all 440 patients were admitted into the borough fever hospital, namely, 388 cases of scarlet fever, 46 of erysipelas, and 6 of small-pox. The report contains nothing very special to the working of the Act relating to compulsory notification.

During the year 1882 the annual death-rate from all causes was 20·0 per thousand. The zymotic death-rate was 3·2 per thousand, the deaths, including small-pox 5, measles 74, scarlet fever 72, diphtheria 5, fever 19, and diarrhœa 214. There were besides 11 deaths from "croup," 12 from erysipelas, and 7 from puerperal fever.

The number of cases notified to the authority and the admissions into the borough isolation hospital were as under :—

Diseases.	Scarlet fever.	Erysipelas.	Typhoid fever.	Diphtheria.	Puerperal fever.	Small-pox.	Typhus.	Total.
Number of certificates	753	455	110	38	14	16	1	1,397
Admitted into isolation hospital	460	44	*	—	—	30	—	534

* This disease is received into special wards at the general infirmary.

Referring to certain figures given as to admissions into the hospital during the years 1878-82, Dr. Johnston says:—

"From the figures given above you will observe that the number of patients received has, for the last three years, gradually increased in each year, and this would lead many to assume that there must have been an increased prevalence of the specified diseases during this time in the town. Such an assumption is, however, entirely fallacious. On computing the returns for the last three years of certificates sent in by the medical men for diseases which are taken into the hospital, I find the result to be as follows:—

Years.	Small Pox.	Scarlet Fever.	Erysipelas.	Totals.
1880.	0	766	431	1,197
1881.	5	1,023	551	1,579
1882.	25	722	440	1,187

"Calculations based upon these figures and those of *admissions*, reveal the fact that the percentage of admissions to hospital was equal to 23·2 of the cases reported on during 1880; the corresponding percentage in 1881 had increased to 28, while, for last year, the percentage had still further increased, being as much as 45.

"If we deal with the figures under scarlet fever *alone* we find a much greater difference in the rise of the percentage proportion of admissions to reported cases; thus, in the year 1880, the percentage was 30; in 1881, 38·4; and in 1882 no less than 59·5, and this, notwithstanding an allowance being made for the 'Home patients' [*i.e.* patients suffering from scarlet fever received from a Penitent Home.]

"These figures not only expose the fallacy of the conclusion that the increase of the hospital admissions during last year indicated a greater prevalence of scarlet fever, but they also supply an absolute proof that the hospital is gaining an increasing favour among the people, larger numbers of whom now avail themselves of the advantages which the institution possesses for the treatment of infectious cases of disease."

The persistent prevalence of scarlet fever in a town having notification of infectious diseases and means of isolation and disinfection, had naturally attracted special attention, and in the Official Report on Infectious Hospitals, prepared by Dr. Thorne Thorne, and issued during 1882, the following table as to Leicester was issued as an appendix[1]:—

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[1] Supplement by the Medical Officer to the *Tenth Annual Report of the Local Government Board*, p. 296 [c.—3290.]

BOROUGH OF LEICESTER.

TABLE SHOWING THE DEATHS FROM SCARLET FEVER, TOGETHER WITH THE CASES NOTIFIED AND REMOVED TO HOSPITAL SINCE THE COMPULSORY NOTIFICATION OF INFECTIOUS DISEASES CAME INTO OPERATION.

Date.	Deaths from scarlet fever.	Cases of scarlet fever notified to the sanitary authority.	Cases of scarlet fever admitted into hospital.
Sept. 12 to Dec. 31, 1879 .	64*	499	159
1880	117*	802	230
1881	152*	1,065	387

* Including deaths in the borough fever hospital which lies outside the borough limits.

Dr. Johnston deals with the same subject, giving experience spread over a long series of years :—

"The present epidemic visitation of scarlet fever has now extended itself over three years, and, judging from the behaviour of the disease in previous epidemic periods, there is no doubt that its present stay has been an unusually prolonged one. With the view of comparing the course and fatality of the present epidemic with our former experiences of the disease, I have drawn up a statement of the *monthly* deaths during the rise and fall of five previous epidemic visitations. The *first* of these extended over an interval of thirty-one monthly periods, beginning in the second month of 1857 and ending about the sixth month of 1859. During this time the total mortality was 310, which, calculated on the mean population of the three years, represented a death-rate of 4·7 per 1,000 living. The *second* visitation began in the ninth month of 1862, and, maintaining an epidemic prevalence during the succeeding twenty-nine months, subsided towards the end of 1864. The disease caused in all 294 deaths, equal to 4·0 per 1,000 of mean population. The *third* epidemic began in 1869 and remained over an interval of twenty-eight monthly periods, subsiding towards the close of 1871. The total deaths caused by the disease during this time was 382, equal to 4·0 per 1,000 of mean population. The *fourth* epidemic began in the tenth month of 1874, and the disease continued more or less prevalent until the end of November in 1877, a duration equal to three years and three months. The total deaths amounted to 415, or 3·7 per 1,000. The *fifth* epidemic, that which now occupies our attention, began about the eighth month in 1879 and continued prevalent to the end of 1882, equivalent to an interval of forty-five months. The total deaths returned up to the end of last year amounted to 478, equal to 3·9 per 1,000, or a small fraction over the rate experienced during the epidemic of 1874-77. *Thus it will be seen that with a greatly increased population, involving, as it does, the employment of much more extensive measures for the limitation of the disease, this last epidemic of scarlet fever, although prolonged in its duration, has given rise to a lower rate of mortality than was experienced during the first three visitations referred to, while the excess in the rate over that in the fourth period is but fractional in amount.*

"For enabling me to ascertain whether our late experience as to the prolongation of the epidemic was singular among the large towns, I have tabulated the deaths from scarlet fever returned from the twenty large towns during the eight

> years 1875-82, and have also calculated the rates of mortality for each year. From the figures . . . [and] table it will be observed that the last epidemic wave of scarlet fever visited nearly all the towns, and *extended over an interval of time in each of them fully as long as the term of its duration with us.*
>
> "During the prevalence of scarlet fever in 1875-77, the health authorities in Leicester were not by any means so successful in their efforts to secure the removal of infected patients to the hospital as in the subsequent years, and in order to discover what modifying influence our large removals of patients may have exercised on the course and fatality of the disease during the last epidemic period, when compared with the other large towns, I have drawn up in a table the average rates for the years embraced in the last two epidemic periods. Now on looking over the average rates for the three years 1875-77, you will observe that Leicester was the sixth highest in order of scarlatinal mortality among the towns tabulated.
>
> "If we now turn our attention to the average rates for the succeeding five years—during which time the sanitary committee has used every effort to secure the isolation of patients by removal of the infected to the hospital—we find that the rate of scarlatinal mortality in Leicester is the lowest among those towns where the prevalence of the disease assumed anything like epidemic proportions.
>
> "The sustained prevalence of the disease among us ceases to be the subject of wonder when we remember that of the 722 cases reported on as existing in the town during last year, only 430 were admitted to hospital, leaving a residuum of infection in 292 houses scattered throughout the different districts of the borough. Under these circumstances the sanitary committee have not, it is true, been able to arrest the spread of the disease, but the markedly low average rate of mortality recorded of the town for the last five years indicates that the efforts put forth by the health authorities when compared with other towns were largely successful in diminishing the prevalence of the disease, and served in no small degree to reduce its fatality."

According to the report for the year 1883 the annual death-rate from all causes was 19·2, and that from the seven principal zymotic diseases 2·5 per thousand living. The latter group included the following deaths: small-pox 3, measles 15, scarlet fever 91, diphtheria 6, "fever" 10, and diarrhœa 148. There were also 6 deaths from erysipelas, 6 from puerperal fever, and 16 from "croup."

The certificates sent in under the Act relating to the compulsory notification of infectious diseases, and the number of cases admitted into hospital, were as under:—

Diseases.	Scarlet fever.	Erysipelas	Typhoid fever.	Diphtheria.	Puerperal fever.	Small-pox.	Typhus.	Total.
Number of certificates	797	317	85	26	12	4	—	1,241
Admitted into isolation hospital	383	12	*	—	—	12	—	407

* This disease is received into special wards of the general hospital.

On the general question of the compulsory notification of nfectious diseases Dr. Johnston writes :—

"It is now over four years since the notification of their infectious cases was first required of the medical men in the town, and I am happy to say that the evils anticipated by the profession from their fulfilment of this duty have in no way been realised. Their carrying out of the clause, at first considered so objectionable, affords conclusive proof that the fears entertained as to the result of 'breach of confidence' upon their part to the patients under their care have had no actual foundation in practice, for no single instance has come to my knowledge where notification has in any way disturbed the previously existing relation between a medical man and his patient. The profession now fully co-operate with the health committee in this matter, and, after a careful perusal of the reports from various districts where notification is in force, it is gratifying to find that in Leicester this duty seems to have been efficiently performed with the least degree of hardship either to the medical men or the general public. As medical officer of health, I take this opportunity of thanking the members of the profession for the cordial assistance they have thus afforded the Committee in their endeavours to lessen the prevalence of disease amongst the people. Sufficient time has now elapsed to make a review of the work done under compulsory notification of practical importance in discovering what advantages the public have derived from its application. . . .

"As soon as notification became law the greatly increased information received as to the localities where infectious disease existed, enabled the sanitary inspectors to visit and report immediately any sanitary defect or other conditions favouring the spread of scarlet fever, which at that time had gained an epidemic prevalence. From the reports sent in by the inspectors as to the conditions found it was quite clear that no attempts had been made in the great majority of instances to isolate the sick from the healthy; the sending of children to school convalescent from the disease and still peeling was an occurrence very frequently met with; people were constantly found visiting infected houses unconscious of the risk they were incurring; and hosiery and other textile goods were, in scores of the houses, being finished off by mothers as they nursed children suffering from malignant forms of the disease. Milk was also being freely sold in retail shops where children were found suffering from scarlet fever.

"To remedy these self-evident evils, various precautionary measures were, and continue to be, taken by the health committee, and their efforts have been attended with considerable success, for the instances described above, so favourable for the spread of infection, are now of proportionately rare occurrence. The parents of patients are cautioned against sending their convalescent children to school, and printed forms of preventive measures are supplied at the same time for their guidance. The school authorities now receive immediate notice of every house certified as infected, and the children are refused admission until the teacher receives a printed form from the sanitary office declaring the house to be free of infection. The danger to children from this source has thus been materially lessened, and there can be no doubt that many school children have altogether escaped the disease by not being so frequently brought in contact with infected playmates.

"The owners of milk-shops, visited with the disease, are now given the alternative of either immediately stopping their sale of milk or sending their sick child to the hospital and having the house fumigated, in which case they are permitted to continue the sale. It is, of course, impossible to estimate the amount of sickness averted by this means, but there are few, I think, who will question its beneficial influence. Again, every householder in whose family scarlet fever appears is now furnished with a printed sheet setting forth the precautions to be taken, and acquainting him of the penalties he will incur by the exposure of infected persons, clothing, &c., and, as was customary in times past, no householder can now plead ignorance if he send his infected children to school in the peeling stage of the disease.

"During the last four years no less than 1,466 scarlatina patients were admitted into the borough fever hospital. Now, as every one of these cases, if treated at home, would have served as a centre of infection and danger to others, it follows that the isolation of such a large number of patients, drawn as they were for the most part from the denser populated districts of the town, must have saved many children of susceptible age from an attack of the disease.

"As the primary object of all sanitary measures is the prevention and limitation of disease, it cannot be denied that the action here taken with respect to scarlet fever has exercised a powerful influence in checking the rapidity of its spread, and in preventing the disease at any time acquiring its full degree of prevalence.

"Among the chief advantages of notification, as carried out in Leicester, the following, to my mind, are of most importance :—(*a.*) The public are becoming more alive to the pit-falls fertile with disease which surround them ; (*b*) they are awakening to a fuller sense of their responsibilities under visitations of contagious diseases ; and (*c*) they are slowly but surely being made acquainted with the nature and mode of spread of such maladies, with the precautions necessary to arrest their inroad. With respect to this latter advantage, it will be remembered that the public, when notification first came into operation, were living in the grossest ignorance of the points which it touches upon, and large numbers are yet, I am sorry to say, wholly ignorant on the subject. The general enlightenment, however, of a population like Leicester, which now numbers 130,000, must of necessity be a work of time, and we cannot reasonably expect for some time to come to see recorded the full benefits to the public health which must follow the spread of such education in sanitary laws and their requirements.

"The history as to the stamping out of small-pox in seventeen distinct importations of the disease . . . . is conspicuously noteworthy among the proofs of the advantages attending notification.

"It will be observed from the list of certificates sent in that the prevalence of diphtheria has steadily declined, the cases reported in 1880 being more than three times as numerous as in last year. In many of the houses where this disease was reported, the inspectors discovered serious defects in the house drainage, which fully accounted for its appearance. Such defects were at once remedied, and, the nuisance removed, no other members of the family fell sick with the complaint. Prior to the ruling of notification, these defects in house drainage, &c., remained for the most part uninterfered with until they were either discovered in the ordinary course of house inspection, or, where a death occurred from diphtheria, the mortality books first led to their revelation by the special inspection always instituted into the drainage of such houses. During these inspections it was by no means uncommon to find several other members of a family prostrated with the disease, and breathing an atmosphere rendered foul and pestilential from a continuous and abundant entry of sewer gas into the abode. The circumstances just related apply with equal force to many of the cases of typhoid fever met with in times antecedent to compulsory notification.

> "The typhoid fever certificates for the four years, 1880-83, also show a marked and steady diminution in numbers, and the disease is seen to have been about three times less prevalent last year than in 1880. This decrease is in some measure to be ascribed to the more rapid repair of any defects in house drainage, &c., which an immediate inspection of the premises brought to light, but depends especially upon the much more extensive closure of polluted wells. . . . Space will not permit of my entering more fully into a description of the substantial advantages which the public derive from the compulsory notification of infectious diseases, but sufficient proofs of its efficacy as an instrument in the limitation of human suffering have here been brought forward to commend its acceptance by health authorities generally."

During 1883 the epidemic prevalence of scarlet fever was maintained, ninety-one fatal cases occurring from that one disease. In a previous report Dr. Johnston had pointed to some reduction in the scarlet fever mortality during the epidemic which had followed on compulsory notification as compared with those that had preceded it; but he now shows that the 1879-83 epidemic had already extended over sixty-three months, that it had caused in all 579 deaths, the death-rate per thousand of the mean population reaching 4·7—in other words, the same as that obtained during the 1856-60 epidemic. It will thus be seen that, compared to previous visitations, the 1879-83 epidemic had extended its stay over a longer period than the previous ones, and that its fatality equalled the highest that had been recorded. Dr. Johnston then, in a series of tables, compares the scarlet fever mortality of Leicester with that of other large towns, and he proceeds:—

> "If attention be now directed to the death-rate in Leicester during the same period (1878-83) it will be observed that, compared with the epidemic in 1875-76, the disease remained prevalent over a much longer period of time, the total fatality was much greater, but the death-rate was *for each year* less excessive. Again, the mortality in Leicester *during the full prevalence* of the disease was not by any means so high as that recorded of other towns. Proof is thus afforded that in Leicester the disease never attained a full degree or prevalence, owing, no doubt, to the extensive removal of patients to hospital, the number isolated, as previously shown, having been equal to about 44 per cent. of the total cases certified in the four years. But when this isolation was effected, there still remained in the town cases of the disease in fifty-six out of every hundred houses certified (the parents here refusing to allow of their children's removal to hospital); and to indiscretion and carelessness on the part of parents during the nursing of these children at home we must mainly attribute the prevalence of the disease through so prolonged a period. The past course of the disease in the town may, in fact, not inaptly be compared to what is constantly observed in a home infected with it, where a persevering attempt is made at isolation. . . .

"The prolonged prevalence of scarlet fever in Leicester has undoubtedly arisen from the continuous check given through isolation to its natural rate of spread; still, on the other hand, it will not be denied that very many children of susceptible age must have escaped the disease through the same means. And many persons will in future thus continue to escape scarlet fever through the isolation practised, but (with the limited powers for compulsory removal which the health authorities possess), so long as isolation is not applied to the main bulk of the cases of fever reported, a prolongation of its stay, with accompanying evils, will be the inevitable consequence."

The following tables usefully summarise some of the more important matters referred to in connection with the influence of the notification of infectious diseases in Leicester:—

TABLE I.—PROPORTION OF DEATHS FROM SPECIFIED CAUSES TO 1,000 DEATHS.

Date	1877	1878	1879	1880*	1881	1882	1883
Small-pox	2·4	0·4	—	—	0·7	1·9	1·2
Scarlet fever . . .	13·1	4·8	39·6	40·1	69·3	28·4	36·6
Diphtheria	3·6	2·5	4·2	7·7	4·1	1·9	2·4
"Fever"	7·9	12·4	7·9	15·5	10·9	7·5	4·0

* Notification in full operation.

TABLE II.—ANNUAL RATES OF MORTALITY PER 1,000 LIVING AT ALL AGES.

Date.	Estimated Population.	Rate from all causes.	Rate from principal zymotic diseases.	Rate from scarlet fever.
1877	117,462	Average during 1870-79 24·3	Average during 1872-1881 4·9	Average during 1870-78 0·8
1878	119,845			
1879	117,610		2·8	0·8
1880*	120,325	24·7	6·9	0·9
1881	122,376	21·6	4·4	1·5
1882	126,275	20·0	3·2	0·6
1883	129,483	19·2	2·5	0·8

* Notification in full operation.

TABLE III.—SHOWING THE PROPORTION OF THE DISEASES ISOLATED BY THE AUTHORITY TO THE TOTAL NOTIFIED UNDER THE SPECIAL ACT.

Date.	SMALL-POX.		ERYSIPELAS.		SCARLET FEVER.	
	Cases notified.	Cases received into Isolation hospital.	Cases notified.	Cases received into Isolation hospital.	Cases notified.	Cases received into Isolation hospital.
1880	—	1	442	47	802	230
1881	4	6	566	42	1,065	393
1882	16	30	455	44	763	460
1883	4	12	317	12	797	383

(*To be continued.*)

VACCINATION AND SMALL-POX IN ST. PANCRAS.

OWING to a threatened prevalence of small-pox in St. Pancras Mr. Shirley Murphy in March 1884 suggested that the Vestry should place themselves in communication with the Board of Guardians with a view to the making of a house-to-house visitation, and with the assent of the Local Government Board nine gentlemen from University College Hospital were selected to act as assistant vaccination officers under the superintendence of Mr. G. W. Collins, L.R.C.P.

Mr. Collins has issued a report of the proceedings which he organised and of their results. Every house in the parish was visited by an official having the requisite medical knowledge for the purpose; the total number of houses being 21,885, and the estimated population being 239,174. After explaining some of the preliminary proceedings undertaken, and the special arrangements made to ensure the vaccination of those found to be unvaccinated, Mr. Collins gives the results of his visitation, and his statement forms a document of such exceptional interest and value that we quote a portion of it in full:—

> The entire house-to-house inspection lasted only twelve weeks, owing to the energetic and conscientious way in which the gentlemen who undertook the visiting performed their duties, and the absence of a single complaint shows with what tact the inquiries were made. The visiting officers were generally well received, and

in but few cases was any indisposition shown to give the required information, and these cases occurred only among the lower classes.

The nine visiting officers have together visited a total number of 21,885 inhabited houses, of which 2,204 (about) were let in tenements, and have obtained statistics of 142,788 persons, and, above all, have increased the amount of vaccination in St. Pancras to a very large extent.

I will now give a brief summary of a few of the points brought to light by the inquiry.

I have tabulated the results of the inquiry as follows, dividing the visited into the following classes:—

Vaccinated, first class.
Imperfectly vaccinated.
Unvaccinated.
Under vaccination.
Information refused.

By first class vaccination is meant "foveated" (or pitted and depressed) vaccination marks, equal in total area to half a square inch.

Imperfect vaccination includes—1. Marks that are not foveated (or pitted). 2. Marks less than half a square inch in total area. 3. Marks of doubtful origin. 4. No marks to be seen, but vaccination stated to have been performed.

The unvaccinated class includes those who deny having ever been vaccinated, and on whom there are no marks. Also those persons who are stated to be insusceptible to vaccination.

"Under vaccination" includes those in whom the scabs from recent vaccination had not fallen off at the time of the visit.

The measurements were made by means of a graduated measure of the Local Government Board Standard.

The total number of persons examined is as follows:—

Under 1 year of age	3,499
1 to 10 years of age	26,537
Over 10	112,752
Total . . .	142,788

The condition of vaccination of those under one year of age was—

		Per cent. of those examined.
First class vaccination . . .	1,658, or	50·5
Imperfectly vaccinated . . .	296, or	9·02
Unvaccinated	952, or	29·04
Under vaccination	372, or	11·34
	3,278	
Information refused	221	
Total . . .	3,499	

The large number of unvaccinated children is accounted for by the majority being under three months of age.

From 1 to 10 years of age—

		Per cent. of those examined.
First class vaccination . . .	20,504,	or 79·11
Imperfectly vaccinated . . .	5,127,	or 19·78
Unvaccinated	225,	or ·86
Under vaccination	61,	or ·23
	25,917	
Information refused	620	
Total . . .	26,537	

The above figures show that out of 30,036 children under ten years of age who were inspected, 22,162, or 73·78 per cent., bear evidences of vaccination of the first class, this being undoubtedly due to the efficient way in which vaccination is performed at the public vaccination stations. Now this proportion is not more than the average proportion vaccinated at the public vaccination stations, and it must be recollected that children attending at the public vaccination stations of St. Pancras are invariably vaccinated in such a manner as to entitle them to have their vaccination placed in the first class; the inference is therefore that children vaccinated elsewhere than at the public stations receive much less protection against small-pox, a point to which I think the attention of private practitioners might with advantage be directed.

Of the persons over ten years of age there were—

		Per cent. of those examined.
Vaccinated	71,213,	or 63·34
Re-vaccinated	39,835,	or 35·43
Unvaccinated	1,377,	or 1·22
	112,425	
Information refused	327	
Total . . .	112,752	

In persons over ten years of age a different classification had to be adopted, as it would have been quite impracticable to examine their arms, and we were, therefore, obliged to depend upon the information given to us. Nevertheless, I think the information thus obtained is upon the whole correct and reliable, for much care was taken to test by cross-examination the accuracy of the answers given, and to ascertain whether those who had suffered from small-pox, and were stated to be vaccinated, had passed through this affection before or after their vaccination; and again, whether the small-pox from which they had suffered was the result of inoculation.

It deserves comment that in the Regent's Park district, those

> re-vaccinated were twice as numerous as those only once vaccinated, and there were hardly any unvaccinated; whilst in the poorer districts, such as Somers Town, the proportions were reversed, showing that the value of re-vaccination is better appreciated by the educated than the uneducated portion of the community.
>
> Amongst the children under ten years of age the number marked with small-pox is so small that it may be disregarded, but among persons over ten years the protective power of vaccination is very clearly shown, thus :—
>
> | | Number examined. | Number marked with small pox. |
> |---|---|---|
> | Re-vaccinated . . | 39,835 . . | 29, or 0·08 per cent. |
> | Vaccinated . . . | 71,213 . . | 2,013, or 2·8 ,, |
> | Unvaccinated . . | 1,377 . . | 857, or 62·2 ,, |
> | | 112,425 | |
>
> The above figures are very striking and conclusive, and show clearly enough that but for vaccination more than half the people in St. Pancras over ten years of age would be disfigured by small-pox.

The last portion of the extract quoted is one which should be well weighed by all persons having at heart the prevention of that loathsome and terribly fatal disease—small-pox. As many as 112,425 persons over ten years of age were examined in St. Pancras, and of these 1,377 were found to be unvaccinated. Now, how had small-pox dealt with this 1,377 individuals? As many as 857, or 62·2 per cent., of them were scarred with small-pox, leaving only 520 who had either so far escaped the disease or in whom it had left no visible traces. This fact taken alone affords overwhelming proof of the special danger of small-pox which the unvaccinated incur; but when the 62·2 per cent. attacked is compared with the 0·08 per cent. of attacks amongst those professedly re-vaccinated, the lesson to be learnt becomes even more striking. And this is not all. Out of the 1,377 unvaccinated 857 had had small-pox; but how about the deaths? These 857 were only those whom the disease had ultimately spared. Thus, the comparison is not between 520 unvaccinated who had hitherto escaped, and 857 who had had the disease, but between 520 and 857 *plus* the fatal attacks. In other words, making allowance for the fatality of small-pox among the unvaccinated, only 520 of the unvaccinated over ten years of age discovered in St. Pancras had escaped small-pox, whereas some 1,280 must have been attacked, 857 of them surviving their attacks.

THE PRACTITIONER.

JUNE, 1885.

Original Communications.

OLEUM DEELINÆ IN SKIN DISEASES.[1]

BY JOHN ROBERTS, M.D., ETC. CHESTER.

It is my pleasure to bring before your notice to-day the therapeutical virtues of another member of the hydro-carbon family. This oil, as its name implies, is manufactured on the banks of the Dee, by the Dee Oil Company, by a process of refining, and I may say without fear of contradiction that it is considered the most pure and refined of its kind in the market. It is not my intention to describe to you the refining process, suffice it for me to say that I have here for your inspection a sample of the article itself, specially refined, and which I have used for the past four years with great success. I am not a believer in particular panaceæ and their reputed curative virtues, but I can speak from experience of the greater medicinal properties this oil possesses over any of its family which it has been my custom to prescribe in skin diseases. I have used vaseline extensively, both by itself and as a basis for ointments in a variety of skin diseases, but never found anything so efficacious and satisfactory in its results as deelina oil. It possesses several qualities to recommend itself. It is clean, inodorous, and does not become rancid, and for all it is an oil it would appear paradoxical to say that there is little or no greasiness left after its application. As it is so easily absorbed, I have prescribed it in many cases with success where other remedies had failed. Its therapeutical virtues were accidentally discovered by a gentleman who had been subject to frequent attacks of general gouty eczema, and where all kinds of lotions and ointments had failed to afford any but temporary relief. Decided improvement followed its application at once, and, although he has had several attacks since, no other local application has been used. I now invariably give it the first trial in all cases which I consider suitable for its application. I never prescribe it during the acute stage. I recommend ablutions with either warm bran or oatmeal water, and dry the parts carefully and gently before its application. In all cases of acute general eczema when desquamation begins I order a warm bran or oatmeal bath. Absorbent cotton wool was used in all the cases of eczema of the vulva, to keep the parts separated after the oil was applied. Constitutional causes, if any, were attended to in all the cases.

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[1] Read before North Wales Branch of the British Medical Association.

The oil has been prescribed by several medical men in Chester with very favourable results; also by a few medical gentlemen in Wales, who were present when I read the paper, and also spoke very highly of its virtues. In addition to the enclosed list of cases, I have found it very efficacious in pityriasis capitis, also eczema capitis (impetigo) in children, the scabs being previously removed by poultices.

Several cases of eczema and intertrigo in children during dentition were, some cured, and all relieved, by the daily application of the oil after an oatmeal bath.

Case I.—W. C. D., aged forty-nine, merchant, suffers from acute general gouty eczema. He has been subject to frequent attacks for the last ten years. The first attack occurred ten years ago and was very protracted, local applications having but little effect upon the disease. There have been repeated attacks during the last four years, which generally were well in a week. The remedies employed were diaphoretics and salines, then a warm oatmeal bath; oleum deelinæ now completed the cure without any other local application. Its effects are most soothing and healing.

Case II.—J. D., aged thirty-eight, bank accountant, has suffered for many years from chronic scorbutic eczema of the hands and wrist, generally coming on in the spring. Liquor arsenicalis and tonics internally, and a great variety of local applications, had been tried before oleum deelinæ, which had a most marked effect both in healing and soothing the irritation. There has been no return of the eczema this spring.

CASE III.—J. P., aged thirty-five, a bricklayer, has been subject to attacks of acute general eczema. The last attack was four years ago. The first and second attacks were found very tedious. The third attack was well in nine days. The same constitutional treatment was employed as in previous cases and locally warm bran baths and oleum deelinæ, which had the same effects as in other cases.

CASE IV.—W. D., aged fifty-nine, a joiner, suffered from eczema marginatum of three weeks' duration. Both buttocks and thighs were extensively involved. The irritation at times was unbearable. Diaphoretics and sedatives combined were given internally and oleum deelinæ was employed locally. It soon manifested its soothing effects, but I had to try other remedies, as there was no improvement in the eczema. Opium, lead and prussic acid, successively, produced temporary benefit. At last I added one fluid drachm of chloroform to four fluid ounces of oleum deelinæ. This had a beneficial action at once, the irritation was allayed and the skin took on a healthy action. The patient was well in eight days after the application of this mixture.

CASE V.—J. M., aged fifty-two, housewife, had suffered from acute eczema of the hands and arms for three weeks. This was the second attack. The first attack had been very tedious. It had been treated by lead, opium and prussic acid lotion. The second attack was treated purely locally by bran water bathing for a few days and then the application of oleum deelinæ. The patient was quite well in six days.

CASE VI.—J. C., aged thirty-eight, porter, had acute eczema of hands and arms for fifteen days. This was the second attack; it was excited by washing bottles. The first proved tedious in healing. This attack was treated by bran and oatmeal water bathing and the application of oleum deelinæ. The patient was well in seven days.

CASE VII.—J. H., aged sixty-two, joiner, has suffered for many years from palmar eczema and piles. He has tried a great many remedies for piles and the palmar irritation. Confect. sennæ ordered every night and oleum deelinæ night and morning. He said that it was the best local application he ever had. He was well from the eczema soon, and the piles considerably relieved.

CASE VIII.—H. L., aged thirty-eight, clergyman, has suffered for many years from eczema marginatum of left thigh. The oil in this case had simply a soothing effect. I applied it for two weeks without any real benefit. He had tried a great many local applications prescribed by eminent medical men without relief. I applied strong liniment. iodi, and he was well in nine days, and the disease has not returned.

CASE IX.—J. M., aged 81, widow, has been subject to acute gouty eczema for some years. I applied the oil at the outset of the attack. It produced considerable pain and irritation. This taught me a lesson not to use the oil until all acute symptoms have subsided.

CASE X.—J. W., aged thirty-four, housewife, has had eczema of the leg, with a large indolent place, for four months. Oleum deelinæ was applied all over the leg with a soft bandage for support. Bran water at night. It was completely healed in three weeks.

CASE XI.—J. J., aged sixty, widow, has suffered from acute eczema of the leg with varicose veins for some years. Bran water fomentations were applied for a few days, then oleum deelinæ. After many years of suffering, she was quite well in three weeks.

CASE XII.—P., aged fifty, commercial traveller, had suffered from varicose eczema of the legs for many years. Bran water fomentations were applied for three days, then oleum deelinæ twice a day, with bandage to support and lessen œdema. The patient was well in two weeks.

CASE XIII.—S. P., aged 40, photographer, has suffered from chronic gouty eczema of hands and both thighs for some years. He has been subject to uric acid in the urine and has passed several calculi. The hands look dry and cracking, both on the dorsum and palm. No history of syphilis. Arsenic, liquor potassæ, and potassium iodide were given internally and oleum deelinæ was applied locally. He says that the oil is the best local application he ever tried. It relieves irritation at once. It keeps the skin soft and easy, and has produced marked benefit, but it has not quite cured the eruption. The hands are rather rough and scaly, but the thighs got well after a few applications.

Case XIV.—J. L., aged 24, housewife, suffers from congenital ichthyosis. She is always suffering from dyspepsia and debility. The eruption extends from neck to feet, and is universal. The scales are bright and of a fair size. It has been a source of great pain to her. She had consulted several medical men. When she came to me she was using chrysophanic acid. She was ordered daily bran baths and ol. deelinæ applied night and morning. The scales had entirely disappeared in three weeks and have not returned (now six months). The skin is smooth and soft, but there are remaining furrows where the scales were attached.

Case XV.—J. C., aged thirty-six, housewife, has suffered from eczema mucosum, intertrigo of vulva, off and on for years. She is subject to leucorrhœa. She was ordered bran baths every night and oleum deelinæ applied afterwards. The relief was marked, and the patient was well after three or four applications, always keeping absorbent cotton wool between labia and thigh.

Case XVI.—A. R., aged forty-five, housewife, has suffered from eczema mucosum like the previous case. The same treatment was adopted. Although the disease has a tendency to return, the treatment soon gets her well.

Case XVII.—G. M., aged forty-two, housewife, has suffered from eczema mucosum like the preceding cases. She is subject to ulceration of the cervix and leucorrhœa. She never received so much benefit from any local application, and always keeps it by her.

Case XVIII.—M. M., aged sixty-four, housewife, has suffered like the preceding cases. In her, obesity is the cause. She used the oatmeal water and applied the oleum with marked and immediate relief.

Case XIX.—J. C., aged thirty-five, housewife, has suffered like the preceding. She is subject to leucorrhœa. She has derived more benefit from the oleum than any other local application.

CASE XX.—J. B., aged sixty-four, housewife, has suffered like the preceding for six months. Cancer of the uterus with the vagina implicated; irritation great; two different sedative local applications. Oleum declinæ, she says, is the best I had prescribed for her; it soothed her at once.

CASE XXI.—M. M., aged sixty-six, housewife, has suffered like the preceding for many years. She is troubled with prolapsus uteri and a good deal of unpleasant discharge. She found more relief from the oil than any other local application, always using warm bran water before.

CASE XXII.—S. S., aged sixty-two, housewife, has suffered from chronic erythematous eruption of legs and popliteal spaces for many years. She has been under medical treatment for some years. At the suggestion of her daughter, who had been using oleum declinæ, she tried it, and, to her great comfort and relief, there was a decided improvement in two weeks. The last report I had was that she was then using the oil and very much better.

CASE XXIII.—J. B., aged twenty-six, dressmaker, has had eczema of the hands for some weeks, produced by the dye of the materials used in her work. She tried several local remedies before consulting me. She was ordered poppy heads fomentation for three days, then oleum declinæ. She was cured in six days.

CASE XXIV.—J. R., aged forty-two, fitter, has suffered from eczema of the perineum with piles for many years. The itching in this case was intolerable. He had used a great variety of applications for relief. He was ordered confect. sennæ internally and to use oleum declinæ every night, after bathing first in oatmeal water. Relief was immediate, and he soon got quite well.

CASE XXV.—J. D., aged fifty, joiner, has had eczema of the hands and arms for a month. He is subject to an erythematous rash upon his hands. The present attack came on after a cold with some rheumatic symptoms. Diaphoretics and alkalies were given internally. Bran baths and oleum declinæ were used locally. He was well in five days, and the hands have been perfectly free ever since.

Case XXVI.—J. O., aged 44, dressmaker, has had eczema of the hands for some years. Oleum deelinæ soothed the irritation, and the hands were quite healed in two weeks.

Case XXVII.—C. H. W., aged eight months, has had acute general eczema for two months, caused by dentition. The irritation was very great. A sedative powder was given at night. Bran baths and oleum deelinæ were used locally. The child was quite well in two weeks.

Case XXVIII.—M. K., aged sixty-four, housewife, has had eczema of both legs with œdema for some years. She has been suffering from heart disease with œdema of feet and legs and a varicose state of legs. Then she had a sudden outbreak of weeping eczema. Poppy-head fomentations were used for a few days, then oleum deelinæ. The oil has proved the best local application, having tried a great variety of liniments, ointments, &c., for many years. She is subject to relapses, but always uses the oil.

Case XXIX.—H. H., aged 68, housewife, has suffered from erythema of the legs and thighs for some years. She is subject to attacks of acute erythema of legs and thighs, and sometimes of the face. I always used the lead and opium lotion with camphor and lime; but she finds the oil more soothing and healing than previous applications. She has used it in two attacks, and got well much sooner with the oil.

Case XXX.—J. T., aged thirty-eight, housewife, has had acute eczema of the hands and arms for three werks. This is the second attack. The first was more general, the face being implicated and œdematous. Bran bath and oleum deelinæ only were used. She was cured in five days.

Case XXXI.—J. F., aged forty-four, gas inspector, has suffered from eczema of the perineum for some years. He is subject to bleeding piles and great irritation of the seat. He used oleum deelinæ with marked relief, and was well in three weeks.

Case XXXII.—J. G., aged sixty-two, master bricklayer, after suffering from eczema of the ears for several weeks, was cured in five days.

Case XXXIII.—J. N., aged sixty, gentleman, has suffered from eczema in both legs for many years. He has been troubled with varicose veins for many years and great irritation. He tried a great many different local remedies. After using bran-water ablutions and then oleum deelinæ, he experienced immediate relief, and was much improved in ten days. I have not seen him since.

Case XXXIV.—W. R. J., aged forty-two, engine driver, was subject to piles and excoriation about the anus for many months. He used bran water and applied oleum deelinæ and was well in six days.

Case XXXV.—J. R., aged forty, tailor, has suffered from chronic eczema of the hands and anus for many weeks. He is rather a delicate man; subject to dyspepsia. I prescribed small doses of iron and arsenic. Oleum deelinæ afforded relief from irritation, and he was quite well in three weeks.

Case XXXVI.—J. P., aged twenty-one, printer, has had sycosis for two years. Both the chin and cheeks were involved in an erythematous state. I applied oleum deelinæ, which produced considerable irritation. In five days I added benzoate of zinc and the irritation subsided. He went on with the oil afterwards and was nearly well in three weeks.

Case XXXVII.—W. T., aged thirty-eight, commercial traveller, has had chronic eczema of both hands for many months. He has been in delicate health for some years. Took a course of tonics and tried a great many different local applications, but with merely temporary relief. Oleum deelinæ was finally tried, and he was well in three weeks. It was combined with benzoate of zinc at first.

Case XXXVIII.—J. B., aged twenty-eight, upholsterer, has had irritation of the seat for two years. He has been subject to piles for years, which were removed by operation three years ago. Irritation of seat returned, and at times it was very distressing. Had prescribed several kinds of local application before oleum deelinæ, which afforded him more relief than any thing else. He is now much better, but not quite free from the irritation.

Case XXXIX.—J. P., aged twenty-one, bricklayer, has suffered from sycosis for two years. He has tried a great many remedies. I prescribed oleum deelinæ, which caused considerable irritation and pain. I added ʒj oleate of zinc to ℥j oleum deelinæ;

inflammation subsided, and in two weeks he again commenced with the oil. It suited him admirably, and he was quite well in three weeks.

CASE XL.—W. P., aged thirty-five, stationer, has had acute general eczema for five days. He has been threatened by attacks for some time. He is evidently of the rheumatic diathesis. I ordered saline diaphoretics. On the 8th day the skin began to desquamate. A bran bath was then ordered, and oleum deelinæ used afterwards daily. He was completely cured in thirteen days, and has had no return of his skin troubles.

CASE XLI.—F. T., aged twenty-eight, bricklayer, has had chronic eczema of the hands for many months. The palms of both hands had been rough and cracking for months; had applied different remedies. Ordered ablution twice a day with oatmeal water and oleum deelinæ applied. He was able to resume work in two weeks, and he is now well.

CASE XLII.—G. J. H., aged fifty-eight, merchant, has had eczema of both legs and anus for some months. He has been subject to frequent attacks of gout for years. The eczema appeared first around the ankles, then the whole of the legs became involved. Constitutional remedies were administered, and oleum deelinæ applied to the inflamed parts. The oil brought on a very copious eruption, a good deal of pain and weeping. I stopped it at once and ordered hot poppy-head fomentation; in five days the inflammation had subsided and some oxalate of zinc ointment applied. After a month's treatment, not much better, and had the oil again, which had much the same effect. It evidently did not suit this case. He is now using an almond oil emulsion with zinc, and is gradually recovering. The medicine, no doubt, also acts upon the gouty element, and facilitates recovery.

SHORT NOTES ON THERAPEUTICS.

BY H. MACNAUGHTON JONES, M.D., F.R.C.S.I. AND EDIN.,
Examiner in the Royal University of Ireland.

(*Continued from* p. 359.)

I MAY perhaps say a word in favour of a preparation of mercury which I have constantly employed for fifteen years, first at the suggestion of the late Tilbury Fox, and which has never in my hands been attended with unpleasant consequences; it can be administered for a considerable time, produces no diarrhœa, is specially suitable in the instance of delicate women suffering from secondary eruptions, and can be combined in pill in combination with quinine and arsenic—namely, the bicyanide of mercury. The bicyanide requires to be carefully compounded and is best ordered in mass with some bread crumb, a drop of mucilage, and extract of gentian. Such a pill, containing $\frac{1}{12}$ grain of bicyanide, one grain of quinine (with or without $\frac{1}{10}$ grain of arsenious acid), is small and can be taken three times in the day. Nor does its exhibition interfere with the administration of iodide of potassium or the combination of the three iodides. I do not desire to detract from the therapeutical value of the bichloride salt or mercurial fumigation in the treatment of syphilitic conditions, I merely refer to this bicyanide preparation as I find its activity and utility are not as generally known as they might be. Referring once more to hereditary syphilis, it is important to note how much it is in our power to modify, arrest, and prevent, by impressing on parents those unmistakable warnings, from infancy to puberty, which denote the incipient manifestations of the latent taint. The early symptoms of naso-pharyngeal troubles in respiration and phonation, the premature decay of the teeth, especially the incisors and premolars (Hutchinson) the various cutaneous indications in hands and feet, or the departures from the healthy standard in shape and consistency of the osseous system, cataractous degenerations in the crystalline lens, are not infrequently precursors of graver syphilitic mischief in the eye. When the early proofs of syphilis have disappeared in the infant, these later reminders come with more or less severity and should indicate a close scrutiny into the previous history of the patient. At least those who continue to have medical supervision of such children as they grow up should bear in mind this predisposing element in the etiology of affections that otherwise might yield to ordinary treatment, and the very obstinacy of which should arouse their suspicions. In interstitial keratitis it is that we see such benefit follow from the exhibition of iodides and iodine. After a mild mercurial course, the syrup of the iodide of iron, given in full doses (or the syrup of hydriodic acid, if the iodide be not well borne) has the best effect.

In thus alluding to iodine I may state my experience of the value of iodoform administered internally in certain cases of syphilis in which the iodides appeared to have little effect. I do not generally give it in larger doses than one grain or a grain and a half (three times daily). I continue its use, unless it is contra-indicated by any sense of fulness in the head or headache. Especially when combined with the application of iodide of starch externally I have seen in ecthymatous ulcerations striking benefit accrue from its employment. Like iodide of potassium, from which I have known alarming symptoms of iodism arise with violent frontal headache, when only two doses containing altogether seven grains were taken, iodoform is not tolerated in any quantity by some, yet may be safely persevered in for a considerable time with others.

But it is not in syphilitic affections of the eye alone that the overlooking of the therapeutical effects of mercury is so serious. In plastic iritis, sclero-choroiditis anterior, irido-cyclitis, sympathetic iritis, mercury by inunction or internally, pushed to the point of salivation, will frequently both arrest the disease and prevent those future exudative changes which result in either atrophy, adhesion, or glaucomatous obliterations of the filtrating structures. More particularly should the therapeutic value of mercury be remembered in the instance of an eye threatened with sympathetic ophthalmia. It is the one therapeutic agent, outside enucleation of the injured eye, which I have seen arrest the progress of sympathetic inflammation. In a few cases in which, within a fortnight aftei enucleation, sympathetic symptoms manifested themselves in the uninjured globe, to the extent of lacrimation, dimness of vision, ciliary injection and slight increase of tension, I rapidly touched the gums with mercury, vision was completely restored. It is in such cases in combination with mercurial treatment that the subcutaneous injection of pilocarpine, resorted to early, has such a powerful effect. The question of the instillation of atropine or escrine in the early stages of sympathetic iridochoroiditis is an important one. For my part, in most cases of slight ciliary injection with any increase of tension when an eye has been injured, it has of late years been my invariable practice to instil eserine or pilocarpine. The danger of a mydriatic where there is a tendency to serous effusion and injection of the ciliary region is considerable. As is widely known it is disastrous in the later stages and when glaucomatous indications are present with further iritic complications. Altogether different is it in ordinary plastic iritis in which parenchymatous inflammation threatens contraction of the pupil and synechiæ. Here atropine is our sheet anchor.

Touching enucleation of the globe in cases of disease and injury it is a question that does not enter into the scope of these papers. I can only here give, in passing, the results of my experience of over two hundred cases of enucleation for various forms of injury and either malignant, atrophied, or staphylomatous globes. Looking back on my fourteen years of work in the Cork Ophthalmic Hospital and the corresponding period in private, I cannot recall to recollection one single case in which I had to regret the removal of a globe, on careful examination of the eye after operation, or from sympathetic mischief arising in connexion with the operation. On the other hand I have had in a few cases to regret my own want of decision in pursuing the expectant and nursing plan, and several times have I seen patients return with vision entirely and permanently lost who either refused or were encouraged not to submit to removal. Only in a few instances have I seen the fellow eye lost after enucleation from sympathetic mischief. In these cases, doubtless, the irritation was induced prior to the operation. Such a case—a little patient of mine—was operated on by the late Mr. George Critchett, four years after I had removed the injured globe, by his method of lacerating the tough capsule with two needles, in this instance with a good result (Ophthalmic Hospital *Reports*, June 1881). I had operated five weeks after the injury when only incipient signs of sympathetic inflammation were present. These subsided after the removal of the affected eye, but returned and resisted every means of treatment. In no effort of conservative surgery is greater responsibility incurred than in the attempt, frequently futile, and always risky, to save an eye the vision of which is seriously and permanently injured, if not completely lost, from a severe accident, especially such wounds as those the result of gun-shot, penetrating wounds, the entrance of foreign bodies, contusions involving the corneo-iritic angle and ciliary region. "Masterly inactivity" will not avail, and he who hesitates risks something more than his own reputation. The rules guiding ophthalmic surgeons in determining the question of enucleation are now clearly defined and pretty widely accepted. I think we may, broadly speaking, say that these states generally indicate the necessity for enucleation; (*a*) such grave injuries as render recovery of vision hopeless; (*b*) iridocyclitis, with loss of vision; (*c*) the entrance of foreign bodies into the globe, which cannot be removed by the electro-magnet or otherwise; (*d*) disorganised, shrunken, irritable globes; (*e*) sensitive eyes in which there are cicatricial contractions; (*f*) painful and sightless glaucomatous globes; (*g*) gliomatous and malignant growths. It may be just as well to insist that a certain degree of vision in the affected eye does not contra-indicate though it must increase the responsibility of the operation. An obstinate and recurrent iridocyclitis in a sensitive eye (where fingers can be counted) may destroy the useful one and the eye should be removed. On the all important question of the propriety of enucleating when sympathetic ophthalmitis has already set in, my experience would lead me so to do under any of the above conditions, and I would only hesitate in the event of the injured or affected eye retaining a certain degree of useful vision. This brings me to a few brief remarks on the value of mydriatics and myotics in ocular therapeutics. This tabular list of the ophthalmic alkaloids may be acceptable to my readers.

MYDRIATICS.

	SALTS.
ATROPINE (Pure).	Arseniate. Borate. Hydrobromate. Hydrochlorate. Salicylate. Sulphate. Tartrate. Valerianate.
COCAINE (pure).	Citrate. Hydrobromate. Hydrochlorate. Salicylate. Tartrate.
DATURINE (Pure).	Hydrochlorate. Sulphate.
DUBOISINE (Pure)	Sulphate.
GELSEMININE	Hydrochlorate. Nitrate. Sulphate.
HOMATROPINE	Hydrobromate. Hydrochlorate. Salicylate. Sulphate.
HYOSCINE	Hydrobromate. Hydrochlorate. Hydriodate.
DATURINE (Pure).	Hydrochlorate. Sulphate.
HYOSCIANINE.	Sulphate.

MYOTICS (SALTS OF ACONITINE OMITTED).

	SALTS.
PHYSOSTIGMINE (Escrine)	Hydrobromate. Hydrochlorate. Nitrate. Salicylate. Sulphate. Tartrate.
PILOCARPINE	Hydrobromate. Hydrochlorate. Nitrate. Salicylate. Sulphate. Tartrate. Valerianate.

I have used the hydrobromate and salicylate salts of atropine, the former for its greater stability, the latter believing in its slight antiseptic properties. Of late I have reverted to the sulphate salt. It is well in prescribing atropine, until the pharmacopœial solution is altered, that practitioners should carefully distinguish, by writing the formula in full, the simple solution of sulphate of atropine in water from the pharmacopœial "Liquor Atropiæ." The latter, containing as it does one drachm of rectified spirit, is a stimulating application, unsuitable for ophthalmological purposes, and causes, as a rule, smarting of the eye when it is instilled. The utterly "behind the time" character of the present British pharmacopœia explains, it may be, the presence of this preparation in our pharmacopœia alone. As I have already shown, it is prudent to order but a small quantity of any alkaloid, so prone are all these solutions to decomposition. But I think it is equally essential in prescribing drops for the eye to write the strength in percentage form—1 or 2 per cent. This ensures greater accuracy and uniformity. These alkaloidal solutions should be compounded at the time of ordering, and not retained as stock solutions. If they are thus kept for any time the strength will be found to vary and the effects to differ. For ophthalmoscopic purposes $\frac{1}{10}$ per cent. is sufficient; for therapeutical we need not exceed 1 or 2 per cent. It is well to warn patients of the temporary mydriatic effects of atropine, and its interference with accommodation. Otherwise with nervous persons an excusable alarm, and it may be foolish prejudice, may follow when the disagreeable dazzling and inability to read is experienced. Simple as this precaution is I have on a few occasions lost a patient by not observing it. Also, in different individuals, the effect of atropine on the iris varies. The same ophthalmoscopic solution will have a more persistent and powerful mydriatic influence. This might require the use of eserine to counteract. It may as well be remembered that when atropine is employed, and during its action on the pupil, any morbid change may take place in the retina. This may be and has been attributed, ignorantly, to the employment of the mydriatic, hence all the greater reason to point out its safety and object before using it. But for ophthalmoscopic examination solutions of homatropine ($\frac{1}{4}$ per cent.), gelseminine ($\frac{1}{2}$ per cent.), cocaine (1 per cent.), are to be preferred by reason of the short duration of the mydriasis.

Perhaps nothing more clearly proves the advantage of exact therapeutical knowledge, and knowledge based on pathological and physiological research, than the therapeutical indications for the use of mydriatics and the revolution which some ten years have produced in their application in ophthalmic medicine. The universality, a few years since, of the employment of atropine in inflammatory states of the eye, both of its superficial and deep tunics, offers a strong contrast to the discrimination now shown in its use. That we must frequently have done mischief in resorting to atropine in some iritic inflammatory states, and in all glaucomatous conditions, is clear from our advanced knowledge of the physiology and pathology of the vascular apparatus of the globe. And though in special writings on the subject, and in ophthalmological works, this relation of mydriasis to the circulation in the important territory adjoining the iritic angle and in the ciliary zone has been dwelt on and explained, still it is to be regretted that the care required in prescribing atropine under certain conditions is not as widely exercised as it ought to be. Nor can this be expected until a knowledge of the earlier symptoms of glaucoma, and the ready recognition of the conditions which slowly lead up to or produce glaucomatous states become more general. How often do the slight increase of tension, the limitation or diminution of the field of vision, the early "neuralgic" pain, the almost imperceptible sluggishness of the pupil, pass unnoticed, and glaucoma comes only to be recognised when increase of the ocular tension, resulting in hardness, or some dulness of the cornea and evident loss of visual power, with amblyopic troubles, arouse attention and no longer leave room for doubt. But such earlier indications, backed up by such ophthalmoscopic proofs as arterial pulsation and incipient excavation of the papilla and venous fulness should serve as danger signals, and warn the practitioner of the indications of the approaching calamity. The question of the knowledge of the information conveyed by the ophthalmoscope comes to be a serious one for every man in general practice, and forces the responsibility which the want of acquaintance with the use of an instrument within the reach of all involves. Most undoubtedly we are greatly indebted to De Wecker's teaching for the better appreciation of the influence of passive obstruction in the trabecular lymph-canals of Schlemm and Fontana, to the physiological importance of which, as filtrating or excretory structures, Leber had previously drawn attention. It is more than nine years since De Wecker drew attention to this important fact, following on the careful dissections of Knies and Waldeyer. Weber and Weiss were the collaborators in solving the etiological problems of the rationale of operative procedures at the iritic angle in the cure of glaucoma, such as the iridectomy of Graafe, the sclerotomy of Wecker, and cyclotomy as advocated by Mr. Walker. This knowledge was supplemented by the researches of Priestly Smith into the effects of diminution of the circumlental space, from changes in the shape and size of the crystalline lens and corresponding encroachment on the ciliary processes and iris, and pressure on the former by the latter. Brailey also, by drawing attention to the secondary atrophic changes in the ciliary body which follow on turgescent states of the ciliary folds, brought about by inflammatory processes, both in the iris and ciliary body, has contributed to our general knowledge of the results of an occluded, or encroached on, canal of Schlemm. In primary glaucoma Brailey found the ciliary arteries enlarged in 50 per cent. of the cases. But an essential element in the pathological process was the advance of the iris periphery and consequent narrowing of the anterior chamber at this part.

RESEARCHES RELATING TO THE PATHOLOGY AND TREATMENT OF CHOLERA.

BY T. LAUDER BRUNTON, M.D., F.R.S.; AND P. H. PYE-SMITH, M.D.

Concluded from page 355.

In attempting to solve the question whether the action of the poison on the circulation is secondary to that on the intestine or not, we may receive some help from a consideration of the different forms which cholera assumes in different epidemics, or in different cases in the same epidemic. If we were to find that the alterations in the circulation were invariably subsequent to the intestinal changes, or increased and diminished in proportion as the intestinal changes were great or small, we might assume that the circulatory changes were only secondary to the intestinal. But if we find that sometimes the changes in the circulation occur previous to the changes in the intestine, as in Bernard's observation just mentioned; or if we find that the circulatory changes are out of proportion to the intestinal symptoms, then we may assume with some degree of probability that the circulation is affected by the poison more or less independently of the intestine. Now in the epidemic at Genoa in 1884 Klebs found[1] that the intestinal discharges were very slight even in persons who died with all the usual symptoms of failure of the circulation; and he therefore concludes that in these cases the symptoms were not due to any loss of water from the blood caused by profuse intestinal discharge. He attributes the failure of the circulation to vaso-motor paralysis and weakness of the heart due to poisoning by some substance absorbed into the circulation and acting directly on the heart and vessels. Another argument which he brings forward in favour of the chemical nature of the poison is that the spleen in cholera is remarkably small and flaccid, whereas in most infective diseases it is markedly enlarged. So much is this the case that enlarged spleen is sometimes looked upon as a diagnostic sign between poisoning and infective diseases, as in the differential diagnosis between poisoning by phosphorus in which the spleen is small, and acute yellow atrophy of the liver in which the spleen is enlarged.[1] It has been noted however, that in acute yellow atrophy of the liver the spleen may likewise be small if the portal system has been drained by a profuse discharge into the intestines:[2] and this diagnostic point on which Klebs lays much stress can only be regarded as of value when the intestinal discharges have been very slight.

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[1] Klebs, *Ueber Cholera Asiatica*, p. 14, Basel, 1885.

We have already illustrated the difference between affections of the circulation and respiration secondary to intestinal disturbance and those due to the direct action of a poison by comparison of the symptoms caused by eating unripe apples and by eating poisonous mushrooms. In the latter case we settle the question of a direct poisonous action on the circulation by chemical analysis. From the apple we extract no poison, whereas from the mushroom we extract a poison which, when injected into the organism, will produce the same symptoms that were caused by the mushrooms themselves did when swallowed. But other indigestible substances may cause sickness as well as unripe apples, and edible mushrooms might do this, simply from having been eaten in too large a quantity. Here we should receive no aid from the external appearance of the noxious matters, but by applying a chemical test we should see whether we could extract a poison from the mushrooms which had actually been used, and if we failed we should attribute the symptoms to their indigestibility alone. In the case of cholera, the poison may be either formed, just as it is in poisonous mushrooms, within the organisms which cause the disease, or it may be produced like alcohol by the decomposing action of these organisms upon the fluids or solids in the intestine. In either case, however, we should expect to find the poison in the intestinal canal of persons who had died of cholera; and we should expect that by isolating the poison and injecting it into the circulation of an animal we should produce symptoms of cholera. Now a poisonous alkaloid has actually been separated from the intestinal contents of cholera patients by M. Villiers.[1] This alkaloid is liquid, it has a bitter taste and an alkaline reaction. He found considerable quantities of it in the intestine; well marked traces of it in the kidneys; but almost none in the liver, or in the blood of the heart. The absence of it from the liver may however be accounted for by its elimination in the bile: for M. Winter has found alkaloids in the bile of persons who have died from cholera.[2]

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[1] Klebs, *op. cit.* p. 13.

[2] Murchison, *Diseases of the Liver*, Second Edition, p. 262.

This alkaloid when injected under the skin of a frog had no well-marked action. The pulse-rate fell from 39 to 34 and then rose to 40, in one animal; and in another there were some indefinite and transitory muscular movements, but this was all. In a guinea-pig, however, six milligrammes of the hydrochlorate of the alkaloid injected subcutaneously had a marked effect both upon the circulation and movements of the animal. The effect upon the heart was very peculiar, the pulse-rate undergoing periodic variations. At one time it would be 258 per minute, in five minutes more 150, in the next five minutes 60, and then in five minutes more 264; in five minutes again it had sunk to 90, and in five minutes more risen to 252. Three-quarters of an hour after the injection, a sudden trembling seized the anterior extremities, next the posterior, and then rapidly disappeared. The animal refused all nourishment, and died four days after the injection. Two days before death the pulse was found to be only a little slower than it was before the injection. On post-mortem examination subpleural ecchymoses were found, the heart was in a state of diastole and full of blood, the brain was slightly congested. M. Villiers noticed the presence of the alkaloid in the kidneys, but he gives no account of the microscopic appearance of those organs after poisoning by this alkaloid. The condition of the kidneys appears, however, to be an important factor in cholera. It is well known that the Indian arrow poison, curare, kills rapidly by paralysing the motor nerves when it is injected under the skin or introduced into a vein, but that it may be swallowed with impunity in considerably larger doses than would be sufficient to kill if injected subcutaneously. The reason of this is that the poison is eliminated by the kidneys as quickly as it is absorbed from the stomach and intestines, and, consequently, there is never a sufficient quantity of it in the blood at once to paralyse the nerves. But when the renal vessels are tied, or when the kidneys themselves are extirpated so as to prevent its elimination, it produces paralysis just as surely when swallowed as when injected into the circulation. Klebs[1] has observed in cases of cholera at Genoa extensive destruction of the epithelium in the convoluted tubules of the kidney, those very portions of the organ which in all probability excrete the specific constituents of the urine. This destruction of the secreting tissue will not only interfere with the excretion of the cholera poison, but will tend to cause retention of the ordinary products of tissue metamorphosis, and consequently to produce uræmia.

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[1] *Compt. Rend.* tome c. p. 91.

[2] Quoted by Hayem, *Traitement du Cholera*, Paris, 1885.

All the evidence that we have at present tends to show that the alterations of circulation and respiration in cholera are due to the action of a poison on the circulatory and nervous systems; and that this action is, to a certain extent, independent of any alteration in the intestine. Yet in M. Villiers's experiments the effect produced by the injection of the poisonous alkaloid obtained from the intestine of a cholera patient differed in many respects from the symptoms presented by cases of cholera. In particular, he makes no mention of profuse intestinal discharges which form such a striking symptom in most cases of cholera. Nicati and Rietsch,[2] however, have produced symptoms of cholera in animals by the injection of pure cultivations of the comma bacillus into the veins, though not subcutaneously. Such cultivations, when recent, are inactive, but cultivations in beef tea or gelatine for eight days or more produce these symptoms. As this effect occurs even when the bacilli themselves have been completely removed from the fluid, it appears to be due to a chemical poison which they have produced.

As we have already mentioned in the earlier parts of this paper, our experiments upon animals have led us to the conclusion that the secretory nerves of the intestines have the small ganglia of the solar and superior mesenteric plexuses for their centres; and that profuse secretion into the intestine may be produced by extirpation of these ganglia. We should therefore be inclined to suppose that the profuse discharges in cholera are due to an action of the cholera poison, either upon the nerve-fibres passing from these ganglia to the intestine, or to a paralysing action of the poison on these ganglia themselves.

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[1] Klebs, *Op. cit.* p. 14.

[2] Nicati and Rietsch, *Compt. Rend.* xc. 928.

Now, it is very remarkable that these experiments should have just led us to the same conclusion at which Lizars and others arrived from post-mortem examinations made on some of the earliest cases of cholera which occurred in this country. At the autopsy of a man aged sixty-three, who died of cholera on the 17th February, 1832, Lizars[1] noted that "the splanchnic nerves and the semilunar ganglia were exposed and compared on the two sides. Those of the left side were of a red colour throughout, but on the right side they were remarkably pale." In another man, aged forty, who died on the 19th February, 1832, Lizars noted that "the neurilemma of the vagus nerves, and particularly the left one in the thorax, and as far as the pulmonary plexuses, were strongly injected on the œsophagus, the nerves were of a bright red colour. There was distinct vascular injection of the sympathetic nerves in the thorax. The left semilunar ganglion was of a bright red colour from injection of the vessels in its neurilemma and in its substance. On section blood flowed from it in abundance. The recurrent nerve was strongly injected." In another case, that of a girl aged eight, who died on the 24th February, 1832, the record of the post-mortem examination is: "The solar plexus is inflamed, the redness of its nerves is very intense; they are also softened and pulpy; they do no not resist the slightest pressure. The semilunar ganglia are injected, but they are not softened, nevertheless the redness is very distinct. On section nothing flows from them." In another case the record is: "The pneumogastric nerves, the pulmonary and the cardiac plexuses, are all natural. The solar plexus and the semilunar ganglia are red and injected, but not softened; nothing flows from them on section." In the case of a man aged thirty-six, who died after an attack of twelve hours, preceded by four days of diarrhœa, "the solar plexus and the semilunar ganglia were strongly injected, the renal plexuses were evidently inflamed." In another case the record is: "The pneumogastric nerves are red and strongly injected. From the level of the subclavian arteries to the terminal ramifications the injection of the neurilemma of these nerves becomes more marked as they approach the abdomen. The communicating fibres with the solar plexus are softened. The pulmonary and cardiac plexuses are red, much injected, but not softened. The solar plexus, and the semilunar ganglia are very red, much injected, and softened." In his Madras Report on cholera, published in 1824, Mr. Alexander[1] considered the disease to consist of "a sympathetic derangement in the nerves having any link of connexion with the pulmonary nerves." Hamilton Bell, in his treatise on cholera asphyxia, published in 1831, ascribed cholera to a "suspension of the power of the ganglionic or sympathetic system of nerves." This view appeared to be supported by the post-mortem appearances seen by Lizars and others; and it was advanced by Professor Delpech after his return to Paris from a tour of observation in this country. This view found little favour in France, and, a year after Delpech's book was published, Rochoux[2] said that "one would be hissed in Paris if one reproduced the theoretical ideas of the unfortunate Delpech." Nor did he receive any better treatment in this country, if we may judge from the fact that not a single page of his *Étude du Cholera Morbus en Angleterre et en Ecosse*, which the Royal Medical and Chirurgical Society in London possesses, was cut until we did it a month or two ago, although the work was published in the year 1832. This view was again taken up by Sedgwick in 1856,[3] and was advocated by Marey in 1865,[4] but it has not received any great share of attention; and it is thus all the more extraordinary that a long and laborious series of experiments should again have led us to it. Since the time when Lizars made his post-mortem examination on cholera, great advances have been made in microscopic methods, and careful examination of the semilunar ganglia and of the solar and mesenteric plexuses in cases of cholera may give us much more definite information regarding the pathology of the disease than could possibly be obtained from mere observation with the naked eye. At present it is impossible for us to say how the cholera poison paralyses the solar and superior mesenteric plexuses, but that it does so appears to us almost certain from a consideration of the symptoms of the disease, of post-mortem examination, and of the results of our experiments.

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[1] Quoted by Delpech, *Étude du Choléra Morbus*, p. 156.

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[1] Alexander, *Madras Report on Cholera*, 1824, p. 222.

[2] Quoted by Sedgwick, *On Cholera*, Second Issue, p. 12.

[3] Wm. Sedgwick, *On the Nature of Cholera*. London, 1856.

[4] Marey, *Gaz. hebd. d. Méd.* Nov. and Dec. 1865.

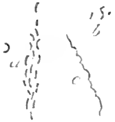

FIG. 1.—*a*, characteristic group of comma-bacilli; *b*, S-shaped comma-bacilli; *c*, spirillum-like threads.

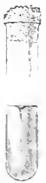

FIG. 2.—Cultivation of comma-bacilli in gelatine, showing the funnel-shaped depression at the point of inoculation.

To sum up, then, we may say, regarding the pathology of cholera, that it is probably an infective disease which is caused, like anthrax and other infective diseases, by some organism.

What the exact nature of this organism is has not yet certainly been proven, whether it be Koch's comma-bacillus (Figs. 1 and 2) or some other.

Cholera differs from other infective diseases in the fact that in it the pathogenic organisms, if such there be, appear to be confined to the intestinal canal, and are not distributed, as in other infective diseases, *e.g.* anthrax, through the blood and tissues of the body generally.

The symptoms appear to be chiefly due to the action on the mesenteric ganglia and vascular system of a chemical poison produced by the pathogenic organisms either within their own substance or by the decomposition of albuminous or other inorganic substances in the intestine.

And here it may be well to note that many observations point to the fact that meteorological conditions, especially peculiar electrical conditions of the atmosphere, greatly modify the course of the disease. At first sight it might appear that this fact was in opposition to the idea that symptoms of cholera are due to the formation of a chemical poison by the agency of bacteria. A little consideration will show, however, that this is not the case, for we know that electrical conditions such as a thunder-storm will cause milk to become sour, although the formation of acid in the milk is due to the *bacterium lactis.*

Certain atmospheric conditions accelerate the formation of acid by this bacterium in the milk, so much that the milk becomes sour in a short time, although ordinarily it might stand for a considerable time without undergoing any such change. Mr. Watson Cheyne informs us that when the milk has previously been sterilised it does not become sour during a thunderstorm. The rapid formation of acid is most probably due to an alteration in the vital activity of the bacteria from altered electrical conditions, and not necessarily to their falling into the milk in greater numbers, as Dr. Lodge has suggested. In the case of the pathogenic organisms of cholera, we can readily imagine that the same would be the case: for there is no reason why altered electrical conditions should not affect them as much in the intestine as they do the *bacterium lactis* in a milk-pan. It is possible that the electrical condition may also modify those ingredients of the milk from which acid is formed and those albuminous or other substances in the intestine from which the cholera poison is produced, as well as the processes of secretion and absorption in the individual attacked by the disease.

In all probability the absorptive power of the intestine will modify the disease. Lewis and Cunningham[1] have noticed that when they injected noxious fluids into the blood, the ileum for a distance of one or two feet above the ileo-cæcal valve remained surprisingly free from the congestion and disorganisation of the mucous membrane with which the other parts of the small intestine were affected. The very portion which escaped injury in these experiments was the one which they found to show the most marked tendency to congestion in cases of cholera. They tried in vain to reconcile the phenomenon with any known anatomical peculiarities of this part of the gut. Since their paper was published a curious physiological peculiarity of this part of the intestine has been discovered by Tappeiner[1] who injected the biliary salts, cholate of soda, glycocholate of soda and taurocholate of soda into the intestines, and found that in the duodenum water only was absorbed, but none of the biliary salts. In the jejunum, glycocholate of soda was very readily absorbed, but the others were not. In the ileum all three were absorbed. The part of the intestine which Lewis and Cunningham found to be most affected in cholera where the poison is absorbed from the intestine, is that where absorption of biliary salts occurs most readily.

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[1] Lewis and Cunningham, *Report of Microscopical and Physiological Researches into the Nature of the Agent or Agents producing Cholera*, p. 91. Calcutta, 1872.

We must now pass on to the last part of our subject, viz. a consideration of the *treatment* of cholera.

To give a list of all the remedies which have been used in cholera would be nearly to run through the Materia Medica. They may, however, be divided into five classes.

The first three classes contain remedies which will act in the intestinal canal.

(1) *Those which are likely to have an antiseptic action in the intestine by destroying any organisms there present.*

(2) *Those which will tend to remove the cholera poison, whether it consist of living organisms or of some chemical substance.*

(3) The third class consists of *those remedies which will counteract the effect of the poison upon the intestinal canal.* These may be given either by themselves, or along with remedies belonging to one of the other classes.

The next two classes of remedies are intended to deal with the poison after it has been absorbed into the general circulation.

(4) The fourth class contains *remedies which will tend to eliminate the poison from the system.*

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[1] Tappeiner, *Sitzungs-Ber. der Wiener Akad.* iii. Abtg. April 1878.

(5) *The fifth, those which will counteract its effects.*

(1) The following remedies belong to the first class, viz. those which will destroy organisms, and which will prevent them not only from exercising any direct injurious influence upon the tissues of the intestine and of the body generally but also from forming any chemical poison which might produce symptoms similar to those of cholera, quite apart from the presence of the microbes which produce it: carbolic acid, sulpho-carbolates, creasote, benzoic acid, napthalin and other antiseptic substances belonging to the aromatic series; sulphurous acid, nitro-muriatic acid, hyposulphites, permanganates, chlorine, chloralum, turpentine, salts of copper, boracic acid, and lastly calomel and corrosive sublimate.

The action of calomel may be looked upon as a double one. A prominent symptom in cholera is the want of bile. Bile is an antiseptic, and its absence from the intestine will tend to allow microbes to grow and multiply in the intestine much more rapidly than if bile were present. By increasing the amount of bile poured into the duodenum, calomel may act as an antiseptic; but it has also an antiseptic action of its own for Wassilieff (*Zeitschr. f. physiol. Chem.* vi.) has shown it to possess a very considerable power of arresting fermentation and destroying micro-organisms. This power is possessed to a far greater extent by corrosive sublimate, which, as Koch has shown, is one of the most powerful of all disinfectants, and differs moreover from such disinfectants as chlorine or iodine in this very important particular—that its disinfecting power is not destroyed by the alkaline character of the liquid in which the organisms are living. This powerful disinfectant action of corrosive sublimate, as compared with calomel, led Grant Bey to suspect that the benefit obtained in many cases from the administration of calomel in cases of cholera, might be due to the presence of a small trace of corrosive sublimate in it as an impurity. He consequently tried the corrosive sublimate alone, and the plan of treatment which he adopted, and which he described in a paper read at the International Medical Congress of Copenhagen in August 1884, was as follows:—if the patient suffered from simple diarrhœa, he gave opium in large doses. In many such cases this sufficed for the cure of the patient; but if vomiting or cramp set in, he immediately suspended the opium treatment and gave the bichloride of mercury in doses of $\frac{1}{10}$th up to $\frac{1}{8}$th of a grain every quarter of an hour, every half hour, or every hour, according to the state of the patient. When he was called to see a patient manifesting all the symptoms of cholera, even in the collapse stage of the disease, he gave the bichloride at once, and had many recoveries to record. Other cholagogues have been employed which, like calomel, may have indirectly an antiseptic action by increasing the quantity of bile in the intestine. Moreover an attempt has been made to replace the normal bile by the administration of ox-bile. Among cholagogues which have been given to increase the secretion by the liver we may reckon ipecacuanha—which has been administered both by the mouth and by enemata—podophyllin, aloes, dilute nitro-hydrochloric acid, and calabar bean.

(2) The second plan of treatment, viz. that of eliminating the poison from the intestinal canal, has led to the employment of castor oil (the use of which has been warmly advocated by Dr. George Johnson), of saline purgatives, and of podophyllin and aloes. Podophyllin and aloes, however, may be regarded partly also as belonging to the first class, inasmuch as they may tend to increase the secretion of bile and thus act antiseptically.

(3) To the third class of remedies, which counteract the effect of the poison on the intestines, belong opium and morphia, ice water, and iced beverages generally, which are used to check the vomiting and purging; belladonna, cannabis indica, chloroform, both internally and by inhalation, chloral; carminatives—such as cinnamon, camphor, oil of cajeput, and capsicum; also astringents such as acetate of lead, salts of copper, and salts of silver.

(4) In the fourth class may be reckoned copious draughts either of hot or of cold water which may act as a diuretic and remove poison by means of the kidneys. Counter-irritation over the kidneys may also be included in this class, which also will include purgatives, inasmuch as they tend to remove the poison from the body.

(5) The fifth class contains those remedies which tend to counteract the effect of the poison upon the body generally; among the most marked of these we may class saline injections into the veins, which by diluting the blood produce marvellous,

though unfortunately only temporary, benefit, as already mentioned. We may reckon also with this the injection of various other substances into the veins such as quinine and the administration of nitrite of amyl, with the view of lessening the contraction of the pulmonary vessels, and restoring the circulation. Various applications to the surface of the body in order to restore the circulation belong also to this class—such as friction, dry packing, wet packing, douche baths, Turkish baths, hot applications, ice to the spine, counter-irritants to the epigastrium, turpentine stupes, nitro-hydrochloric acid baths, mustard plaisters and acupuncture.

Preventive Treatment.—There can be no doubt that the best thing is to prevent cholera if possible: and the mode of doing so has been thus shortly summed up by Dr. J. M. Cunningham, Sanitary Commissioner with the Government of India, in his work, *Cholera, What can the State do to Prevent it?* where at page 130, he says, "Pure air, pure water, pure soil, good and sufficient food, proper clothing and suitable healthy employment for both mind and body, these are the great requisites for resisting the cause, or combination of causes, which produces cholera. The avoidance of over-crowding is just as important as the provision of pure water; good drainage, and good conservancy are essential, just as it is essential that the people should be well housed."

Where one is not sure of the water being pure, it is advisable to boil and filter it, in order to prevent organisms from entering the system. At the same time we must try to increase the power of the body to destroy such organisms as may enter into it. Koch appears to find that the acid of the stomach is very fatal to his comma-bacilli; and even though we may not regard it as certainly proved that the comma-bacilli produce cholera, yet they appear to have been constantly found in cases of cholera; and in his later experiments Koch states that he has found that in pure cultivations they produce symptoms similar to the disease. It is, therefore, advisable to take precautions against them, as well as against any other pathogenic organisms. In his later experiments Koch also states that he has produced symptoms of cholera by giving the comma-bacilli to animals along with a quantity of alkali, so that they are not destroyed in the stomach but pass down into the intestine, where they find a suitable *nidus*. With the idea of increasing the acidity of the stomach and thus preventing pathogenic bacilli from passing through it into the intestine, some have recommended the use of dilute hydrochloric or dilute nitro-hydrochloric acid. But it is to be remembered that the constant use of dilute acids is apt to bring on a condition of gastric catarrh in which the natural secretion of acid by the stomach is deficient. A deficiency of acid of this sort will naturally be favourable to the passage of organisms into the intestine; and therefore in view of an epidemic of cholera, care should be taken to prevent if possible any catarrhal condition either of the stomach or of the intestines. Such catarrhal conditions are not unfrequently induced by exposure to cold, and therefore a warm flannel or silk bandage, or cummerbund, or "cholera belt," as it is often called, should be worn, even in hot weather, around the abdomen to prevent any sudden chill from producing catarrh. For the same reason indigestible food must be avoided and saline purgatives used with caution. Food, either animal or vegetable, that is in a state of incipient decomposition, such as over-ripe strawberries or other fruit, and fish, meat or game which is at all high, ought to be scrupulously avoided.

Treatment of the Early Stages.—In the stage of premonitory diarrhœa we might be inclined to say that theoretically the diarrhœa should not be stopped, because it may aid in the elimination of the poison; but we must remember that the disease is to a certain extent a struggle between pathogenic organisms and the body; and if the diarrhœa be allowed to continue, such alterations may occur in the bowels as may allow the poison to be formed more readily, as well as such alterations in the body generally as to render it more liable to succumb to the action of the poison. In the treatment of vomiting and of diarrhœa, Hayem discountenances calomel but recommends ice, opium, and salicylate of bismuth, in doses up to six or eight grains. Naphthalin, which was found useful in other kinds of diarrhœa by Rossbach, and which seemed to promise most favourably from its power of disinfecting the intestinal contents, does not appear to be so useful as one might have expected; and in place of it Klebs recommends benzoic acid as a more efficient disinfectant. The use of corrosive sublimate has already been considered. Local applications to the intestine in the form of enteroclysms have been warmly recommended by Professor Cantani.[1] He uses thirty to fifty drops of laudanum, fifty grammes of gum-arabic, five to ten grammes of tannic acid, and two litres of boiling water. In place of the simple water, Paolucci and Perli use an infusion of chamomile. This liquid, cooled to the temperature of the body, ought to be introduced with a long flexible tube, as high as possible into the intestine at the very commencement of the diarrhœa. If the flexible tube be not available, the injection may be used with an ordinary enema syringe. Cantani states that in many cases the premonitory diarrhœa is arrested by a single application; and when this is not the case, and the disease becomes well marked, the repetition of the injection four or five times not only diminishes the diarrhœa, but has the further beneficial action of preventing the loss of water from the blood while the secretion of urine continues, of preventing the algide state and allowing the active febrile reaction to follow directly upon the premonitory stage. When this treatment was adopted the injection of water under the skin was never necessary. In the algide stage the subcutaneous injection of ether with warm friction and packing appears to be indicated.

Saline injections into the veins are only to be used in the condition of collapse. The formula which Hayem recommends is pure sodium chloride, five parts; sodium sulphate, ten parts; or perhaps what might be still better, twenty-five parts to a thousand of water. Of this solution he uses two or two and a half litres at blood heat, or even above it. Instead of introducing fluid directly into the circulation, Cantani recommended that water should be injected under the skin. Maragliano[2] finds that this method is very useful, and recommends that it should be employed not only in cases where there has been much diarrhœa and vomiting, but used even when there has been little. Cantani's solution consisted of three parts of soda, three parts of iodide of sodium, and 1,000 of water. To this Maragliano adds three parts of sodium sulphite. Netter[3] has recommended that the saline solution should be injected into the peritoneal cavity rather than into the veins.

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[1] Cantani, *Centralblatt f. die med. Wiss.* 1884, p. 770.

[2] Maragliano, *ibid.* p. 801.

[3] Netter, *Gaz. méd.* 1884, No. 26.

In the stage of reaction Sir Andrew Clark used with great success a powder of the following composition :—Hydrarg. c. Creta gr. ii. ; Pulv. Ipecac. gr. ss. ; Pulveris Doveri, gr. ii.ss. ; night and morning. Hayem recommends citrate of caffeine and brandy.[1]

Before leaving the subject of the treatment of cholera, however, we must mention the recently-introduced plan of inoculation. The method of inoculating with attenuated virus has proved so successful, not only in the case of small-pox, but of anthrax, that it was natural that an attempt should be made to employ it in cholera also. Dr. Ferran, of Valencia, Spain, has lately been testing the effect of inoculation with attenuated cholera virus at Alcira, a town near Valencia, and, he says, with the best possible results. Of 10,500 persons who were not inoculated, cholera has attacked 64, and proved fatal to 30. Of the 5,432 who have been inoculated it has, according to Dr. Ferran, attacked only 7, and proved fatal in no single case. These results are much more successful than one would *a priori* have expected, for as we have already mentioned, cholera differs from other infective diseases in this respect, that the living organisms which may form the germs of the disease are not distributed throughout the blood and tissues generally, as in the case of anthrax, but are confined to the intestinal canal. We should therefore hardly have expected to obtain any great benefit from inoculation, but such questions are to be decided by actual experiment, and not by *a priori* reasoning. We think that the directions in which farther researches after a remedy for cholera are most likely to prove successful are :—

(1) The discovery of an antiseptic which will destroy pathogenic organisms in the intestine and prevent the formation of the cholera poison, while they are not themselves poisonous. Corrosive sublimate is a sufficiently powerful antiseptic, but it may itself prove poisonous to the patient as well as to the pathogenic organisms. It is possible that amongst the members of the aromatic group of bodies the desired substance may be found having the desired properties.[2]

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[1] Aitken, *Science and Practice of Medicine*, Seventh Edition, vol. i. p. 740.

[2] Cf. Sanderson, *Practitioner*, January, 1885, p. 38.

(2) The discovery of some substance which will antagonise the action of the cholera poison after its absorption. As a preliminary step in this direction, farther experiments are needed on the nature and action of alkaloidal substances obtained from cholera dejecta as well as from artificial cultivations in various media and under various conditions, electrical and otherwise.

(3) Observations on the effect of stimulation of the mesenteric plexus by currents passed through the uninjured abdomen in poisoned animals and in patients suffering from the disease.

HEMIPLEGIA.[1]

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My intention in this paper is to deal with the subject of Hemiplegia to the extent of my experience during my period of office as house physician at St. Bartholomew's Hospital.

By hemiplegia we mean a loss of power of voluntary motion more or less complete on one side of the body, and owing its origin to some affection of the cerebro-spinal axis. As a rule, in hemiplegia the muscles of the arm, leg, tongue, and lower parts of the face are affected; and usually the third, fourth, fifth, sixth, and vagus nerves escape, though sometimes these are more or less paralysed; and when this occurs I hope to show that the *seat* of the lesion can be more accurately diagnosed.

Sometimes, hemianæsthesia and aphasia are associated, and by these the seat of the lesion can often be more accurately localised.

I will divide my paper into two parts, discussing in the first part those cases in which hemiplegia is not associated with any discoverable lesion of the nerve centres—*Functional hemiplegia.* In the second part I shall discuss *Organic hemiplegia.*

Perhaps some objection may be taken to the term "functional" on the ground that one cannot have any perversion of function without some corresponding structural lesion. But every one will admit that there are some severe and fatal diseases in which, post mortem, one can demonstrate no structural change by the means at the disposal of the pathologist.

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[1] A paper read before the Abernethian Society, Oct. 16, 1884.

Of course, I freely admit that there may be many molecular changes which cannot be demonstrated, and one may assume these; but surely everybody will admit that there is a vast difference between a coarse structural change, and some unproved alteration in molecular motion. For this reason I feel justified in using the term "functional."

1.—The first variety of functional hemiplegia is the *hysterical.* Of this kind, I have recently had cases under my charge.

Case I.—In one of these, the patient, S. L., was a young woman, aged twenty-two. She had always had good health, had never been subject to "fits" of any kind. There never had been any cardiac disease, and there was no reason to suspect syphilis.

On May 1st, 1884, she began to complain of a sudden loss of power in the left leg, which continued to be weak, though not absolutely paralysed.

On May 17th, she suddenly lost power in the left arm. When admitted to hospital on May 20th, there was considerable loss of power of the left leg, which in walking seemed to drag; the left arm was also weak, but the loss of power in it was not so complete as in the leg. There was much exaggeration of the patellar-tendon reflex in the left leg, and ankle clonus was obtainable (but not in the right leg). No reflexes could be obtained on tapping the tendons of the triceps, supinator, extensor and flexor tendons in either arm. The face and tongue were not paralysed. There was no anæsthesia of any of the senses, and no hyperæsthesia. Examination of heart, lungs, and urine showed no abnormality. She was placed on a good meat diet, a little malt liquor was allowed; tonics were administered, her bowels were regulated; she was encouraged to use her limbs as much as possible; and she received for ten minutes a daily charge of static electricity, sparks being taken from the affected limbs. Under this treatment she gradually improved, the degree of paralysis varying from time to time, and by June 5th she was discharged with absolute cessation of her previous symptoms, and has continued free from any return of them till the present time.

This case illustrates the chief characters of hysterical hemiplegia. The disease may be either sudden or gradual in its onset; it occurs in young females; the left side is the affected one in about three-fourths of the cases; the face and tongue are not affected; the paralysis is incomplete; the leg is more affected than the arm; the reflexes of the affected limbs are either exaggerated or natural or diminished. But one of the most important and useful characters for diagnosis was absent in this case. This is anæsthesia of the affected side of the body. In this case also the paralysis had not come on after a hysterical fit, as it not unfrequently does.

In the absence, then, of these two points, the chief considerations which weighed with us in making a diagnosis were (1) that the leg was more affected than the arm, and that the paralysis began there. Of course it is possible that a hemiplegia due to organic disease of the brain could begin in the leg and then spread to the arm. Thus we could conceive an affection of Ferrier's cortical nerve centres, or of the white nervous tracts leading from them, beginning first in the part that has to do with the movements of the leg, and then spreading to the arm centre. But leaving aside this question, such a state of things is, I believe, extremely rare, if not unknown in practice. In cases of what may be called ordinary hemiplegia the arm is more affected than the leg.

In the second place there was no paralysis of the face and tongue. Of course it is possible that there could be paralysis of the arm and leg of one side of the body, due to disease below the decussation of the motor tracts, but such a condition is very rare.

Thirdly, the paralysis was incomplete and varied from day to day, and fourthly, the recovery was perfect.

The next variety of functional hemiplegia of which I have lately had cases is *epileptic* hemiplegia. By epileptic hemiplegia I mean that which occurs in patients subject to epilepsy. Suppose that a man who never had a fit before has an epileptic fit, after recovering from which he is found to be hemiplegic. Are we to call this epileptic hemiplegia? No. Such an attack may be due to a tumour of the brain, or to some other cerebral lesion, notably some form of cerebral syphilis, or again it may be due to uræmia. What, then, is our definition of epileptic hemiplegia? It is the hemiplegia of epilepsy, and by epilepsy we mean a disease characterised by habitual general convulsions with coma, not due to organic disease of the brain.

Cases of this kind are not very common, but there are many cases in which epileptiform convulsions are followed by hemiplegia, and in these cases, especially if the convulsions have been most marked in the limbs which are afterwards found to be paralysed, we probably have to deal with some organic cerebral disease. The inter-diagnosis of these two conditions forms an important question, to which I shall pay more attention presently.

The following are the chief points of one of my cases of epileptic hemiplegia :

CASE II.—F. G., an anæmic girl, aged twelve, came to the surgery on August 18th, 1884, and her mother gave the following account of her. When six and a-half months old she began to have convulsions, which sometimes were attended with loss of consciousness. When two and a-half years old her convulsions began to be more severe. She used to lose consciousness, become convulsed, foam at the mouth, and bite her tongue. About this time a violent fit came on, she was unconscious for about two hours, and at frequent intervals during that time she became convulsed.

On regaining consciousness there was some weakness of the right arm and leg. This lasted a few days only. Her speech was not affected.

When six and a-half years old one of the fits was more violent and prolonged than before. She was unconscious for nine hours, and was frequently convulsed during that time. On regaining consciousness the right arm and leg were found to be completely useless. Her face was drawn to the left side, and she was speechless.

She remained speechless for one week, and then began to be able to say a few words. From that time her speech improved, till three weeks after the attack she had completely regained it. The leg gradually recovered its power, till four months after the attack she was able to walk perfectly ; the arm also gradually improved for a time, but has remained weak ever since.

Her "fits" continue. Each fit is preceded by an "aura," consisting of palpitation of the heart succeeded by a choking sensation, immediately after which follows loss of consciousness and general convulsions. She foams at the mouth, her respiration becomes embarrassed, the head and eyes become turned to the right side, and she bites her tongue.

When I saw the girl, on August 18th, there were no eye symptoms; the ophthalmoscopic appearances were natural; the tongue was protruded naturally; there was no affection of speech; there was slight palsy of the lower parts of the face on the right side. The right hand was much weaker in grasp than the left; there was some atrophy of the muscles of this arm; no reflexes could be obtained in either arm. She walked perfectly well, and no difference whatever could be detected between the legs.

With the diagnosis in connexion with this case I shall deal presently.

The treatment of epileptic hemiplegia is the treatment of epilepsy. The remedy which I have found of most service is a mixture containing potass. bromid. gr. xx., and potass. iodid. gr. x. ter die.

The hemiplegic paralysis following epileptic fits is usually transitory, and tends to recovery. The treatment required for the paralysis is, therefore, practically nil; but should the hemiplegia continue, shampooing and galvanism should be employed to the paralysed muscles.

I now have to speak of a third kind of functional hemiplegia, viz. *uræmic* hemiplegia. This form of paralysis, the existence of which is almost denied by some high authorities, is a rare occurrence, but an undoubted case of the kind came under my observation just before I was appointed house physician.

Thomas Addison was the first to give an account of apoplectiform conditions in connexion with contracted granular kidneys, and he described two varieties: (1) That dependent on hæmorrhage into the nervous centres of the brain; (2) that which he called "serous apoplexy," in which no cerebral lesion could be found post mortem except some effusion of fluid. These were the cases of complete coma without paralysis or convulsions not due to organic disease of the brain. Some of these cases constitute what we now regard as a variety of uræmic coma. The coma of uræmia is usually very gradual in its onset, but it may be more sudden, and may have all the characters of sanguineous apoplexy. Dickinson says that in a case of granular contracted kidneys an apoplectiform attack *with paralysis* is enough to make us sure that we have not to deal with simple uræmia. No doubt in the vast majority of cases this is so, but not always. The following case illustrates this:—

Case III.—M. D., aged forty-nine, admitted to Mary Ward on January 19th, 1884, with hæmatemesis. She stated that twelve years ago she had brought up blood, also again six years and two years ago. Two years ago she suffered much from epistaxis. On January 18th she vomited blood. She had drunk much. The only symptom of urinary trouble was getting up at night to pass water once or twice during the last few years. After admission she vomited a good deal of blood, which ceased after ergotine. On January 21st hæmatemesis recurred. On the night of January 25th she was delirious, and, succeeding this there was gradually increasing unconsciousness. On January 26th she could not move the right arm, and the face was drawn to the left. Her coma continued and deepened. On January 28th there was coma, but not absolute; she had palsy of right arm and leg, also of left side of face, the eyeballs were turned slightly to the left side, but especially the left one, the right cornea was insensitive to touch; there was no anæsthesia of skin of face.

She died comatose on January 31st. Her urine could only be obtained on one occasion, and contained a *trace of albumen.* On post-mortem examination there were found contracted granular kidneys and cirrhosis of the liver, but no cerebral lesion whatever to account for the nervous symptoms.

(*To be continued.*)

Reviews.

Diseases of the Rectum and Anus. By HARRISON CRIPPS, F.R.C.S. 8vo, pp. 400. London: Churchill. 1884.

IT is some time since a work devoted to rectal disease appeared in this country, and we therefore welcome the present contribution the more readily. There are no new diseases to chronicle, it is true, but our treatment has, during the last few years, made rapid strides. We would instance the results which are now obtained with certainty in cases of rectal prolapse in the adult by the use of the cautery; a mode of treatment for which we are indebted to our American neighbours. This subject is described at some length by Mr. Cripps. Not less interesting are the carefully worked-out results of operations performed for congenital malformation about the anus. It is satisfactory to learn that such cases do recover and grow into healthy adult life, with no trouble from their early introduction to the hands of the surgeon. The subject of rectal cancer is considered with a view to operation, and the author's well-known views are skilfully put forward. The chapter on the etiology of cancer deserves the most careful perusal of every one who looks beyond the mere question of treatment. The illustrations are excellent, and we can cordially recommend this most readable work.

The Medical Annual and Practitioner's Index. A yearly Record of useful information on subjects relating to the Medical Profession. London: Henry Kimpton. 1885.

WE are glad to call attention to this very useful and inexpensive annual, the more that in almost every part this year's issue is a great advance upon the last. When we say that it includes a review of popular and general science, a thoughtful and well-arranged set of sanitary memoranda, an index of doses, a brief but comprehensive account of the regulations and provisions for medical education, a gazetteer of home and foreign health resorts, an account of new medical and surgical inventions with illustrations, an abstract of the year's work on treatment, test types for vision, bibliography of the year, lists of societies, hospitals, and asylums in town and country, with other matter, and space for MS. notes as well, that moreover obvious pains have been taken to present the information given in a lively and "rememberable" form, and lastly that the book can be had for half-a-crown, we need do no more to commend it to the use of the profession.

Clinical Lectures. By RICHARD QUAIN, F.R.S., Surgeon Extraordinary to Her Majesty the Queen. London: Smith, Elder, and Co. 1884.

ALL will congratulate this veteran anatomist and surgeon on the production of the handsome volume before us, with its forty fine plates, and its manifold results of experience gathered during many years of active work. A delay in its publication has been caused by death of the gentleman assisting him, and by his own severe and long-continued illness. Several of the lectures have been published in medical periodicals; those for instance on dislocations of the hip and knee in the *Medico-Chirurgical Transactions.* Among many interesting points brought out we may note the following:—Two cases of hip-disease in children who died from tuberculous meningitis are cited. In one (p. 68) the inflammation was confined to the synovial membrane. In the other (p. 70) the bone also was involved; whether this was secondary to synovial disease is not clear, though it is supposed to have been secondary. The experiment of injecting the healthy hip-joint with a solution of coloured gelatine through a hole bored in the ramus of the pubic bone was made by Mr. Bruce at Mr. Quain's request "with this result:—As the capsule distended the femur was flexed more and more and slightly adducted. When the capsule was fully distended the femur was flexed at about an angle of 25°." This now generally accepted cause of the flexed position in hip-disease has, however, in reality, not so much to do with it as the tension of the ligaments, and consequent pressure of the synovial membrane, which is produced when the joint is extended. The most frequent source of shortening of the limb in hip-disease is said (p. 91) to arise from the diseased state of the connecting cartilage between the epiphysis and the neck of the thigh-bone. It must be difficult to obtain good evidence of this; and the shortening is more often apparent than real and due to tilting of the pelvis. There is described a remarkable, and, we should think, unique case, of great enlargement of the fore-part of the prostate gland, the under-part being unaffected, in a gentleman who died at the age of eighty-one, twenty-three years after the first attack of retention of urine. He had many such attacks, usually from delayed micturition; and they were in each instance relieved by one or two introductions of the catheter, the patient remaining quite free from trouble till another acute attack occurred.

Dental Surgery for General Practitioners and Students of Medicine. By ASHLEY W. BARRETT, M.B. (London), M.R.C.S., L.D.S., Crown 8vo, pp. 83. London: H. K. Lewis. 1885.

THE methods of treatment laid down in this handy and, on the whole, well-written book are good if not always the best, and are such as are in vogue among leading conservative practitioners of dental surgery. One characteristic feature is that the description of the various methods of extraction is retained until the last chapter but one. This is a praiseworthy feature, as a greater or less familiarity with radical treatment seems to be the only acquirement of too many students of medicine. In this little work they will learn that much may be done to relieve pain without resorting to the forceps, and that many teeth may be saved, at least temporarily, by simple expedients. Exception might be taken to excessive brevity in parts: and to actual omission of information it would be politic to supply. The risk of mistaking the first permanent molar for a temporary tooth, a mistake frequently made by inexperienced persons, might have been more emphasised, and the few paragraphs upon the preparation of the mouth for artificial teeth might have been greatly extended. The screw-elevator is not an unmixed blessing, from the risk of splitting off with it a piece of dentine where the roots are firmly fixed, thus leaving an inclined surface difficult to grasp with the stump forceps. The method suggested for the expansion of the arch of a contracted mouth by means of a vulcanite plate and wooden pegs is not the best that might have been recommended in view of the wonderful results obtained with "Coffin's" system of using steel-wire springs. Something more might have been said about the danger of salivary calculus and the necessity for its removal and the subsequent treatment of the gums. A brief description and diagrams of the histological structure of teeth, and remarks upon the different plastic materials for filling teeth, would be a valuable addition.

Clinic of the Month.

Diagnosis of Renal Disease.—The advance that has been made in the diagnosis of renal diseases was well exemplified in a case brought before the students, at the Western Infirmary, by Professor George Buchanan. The patient was a woman, the chief feature of whose ailment was the presence of a large quantity of pus in the urine. The interesting point about the case was that, previously to adopting operative measures, steps had been taken to demonstrate satisfactorily that the right kidney was the seat of mischief, and that the other one was sound. This was accomplished by the use of a recently invented German instrument, by the introduction of which into the bladder, the urine from each kidney is collected separately, and the seat of suppuration determined. The correctness of this diagnosis was verified by the subsequent nephrotomy, performed by Professor Buchanan. (*British Med. Journal*, Feb. 28, 1885.)

Athetosis before and after Hemiplegia.—The relations of convulsion to paralysis form one of the most interesting chapters in the pathology of the nervous system. The popular mind sees a wonderful contrast between convulsion and paralysis, and with good reason. Yet there are many considerations which tend to diminish the contrast. The causes which give rise to involuntary movements need only to be intensified in order that paralysis may result. A moderate defect in the nutrition of nervous tissues subserving motor functions may be outwardly expressed as epilepsy, chorea, or some other form of involuntary movement; whilst a more marked defect in the nutrition would be followed by paralysis. It is true that in many instances genuine irritation calls forth some form of tonic or clonic spasm, which may end in paralysis from exhaustion consequent on the excessive irritation. Perhaps the majority of cases of Jacksonian epilepsy which are followed by paresis may be thus explained, though it is highly probable that a condition equivalent to irritation may be set up as the result of a mere loss of nutrition. Paralysis which is not caused too rapidly is generally preceded by some form of spontaneous movement. At a recent meeting of the Société de Médecine et de Chirurgie of Bordeaux, M. Durand related the case of a man aged sixty-nine who was one day seized with severe epistaxis. The next day a tremor exactly similar to that seen in cases of post-hemiplegic athetosis was observed in the left arm and leg; at least so states the report from which we gather this account. There was no loss of consciousness. A day later the convulsions were replaced by hemiplegia. On the following day the movements had returned, and hemianæsthesia was detected in the convulsed members. The further history of the case was not related, and the description given of the movements is inadequate for a proper recognition of their nature; nevertheless the case is an interesting one. (*Lancet*, April 4, 1885.)

Diagnostic Value of the Fœtal Heart-beats.—Dr. Bolzoni has kept a careful record of the fœtal heart-beats in all cases admitted to the obstetric clinic of the University of Padua for the scholastic year 1883-84. Of these he selected one hundred women between the eighth and ninth solar month of gestation, in whom delivery was normal. The heart-beats were counted in each three times, always at the same hour, and the mean taken. On the birth of the child, its sex, weight, length, and biparietal diameter were entered in the register and compared with the previously determined heart-beats. He finds that the number of the heart-beats is not in relation to the sex of the child, but is in constant and proportional relation to the weight, length, and biparietal diameter; that is to say, to the mass of the body. The smaller number of heart-beats more frequently corresponds to the male sex, only because boys are as a rule heavier at birth than girls. The lowest rate observed was 112, and the highest 168. The first was in a boy of 4,300 grammes weight, 51 centimetres long, with a biparietal diameter of 10·5 centimetres. The second was a girl of 2,570 grammes weight, 46 centimetres long, biparietal diameter 9·5. The two most frequent rates were 128 and 144; to the first more boys than girls corresponded, and to the second more girls. With 128 heart-beats, the weight of the child (of whatever sex) was over 2,900 grammes; with 144, the weight was always less than this. The number of the heart-beats, then, is a more constant guide to the development than to the sex of the child. (*Gazetta Med. Italiana*, Oct. 4, 1884.)

Area Celsi.—That alopecia areata depends upon the growth of a fungus is a doctrine that has been often advanced only to be refuted, and has now few, if any, supporters. Nor can there be any doubt that mistakes have been made in the various attempts to settle what might seem to be a simple question, and certainly amongst those who have upheld the parasitic nature of the affection there has been little agreement as to the precise nature of the fungus concerned. It has been reserved for these days of microphytic pathology to revive the doctrine in a more refined form. Alopecia areata is due to the growth of a micrococcus, at least, so says Dr. von Schlen of Munich in a paper contributed to the current number of Virchow's *Archiv.* He describes five cases, in all of which the stunted and diseased hairs were mostly the seat of colonies of micrococci, averaging 0·5 μ in diameter, some smaller ones being of the diplococcus form, and larger ones with median constriction. From their situation in the shaft, it would seem that they occurred in connexion with the ducts of the sebaceous glands, and it is inferred that they invade the hairs by these ducts. The micro-organisms were not found in any but the diseased hairs, and not universally in them. By cultures in agar-agar peptone it was ascertained that the organisms were distinctive in their mode of growth, and experiments were made with a view to ascertain whether they were really capable of transmitting the disease; on the human subject the attempt failed, but on white rats there appeared, on the spots where the material of some of the cultures had been rubbed in, scaly patches, over which the hairs at first became yellow-coloured, and then fell out. The writer reconciles the notion that these micro-organisms have a causal relation to the affection with the other well-proved facts of its association with trophic disturbances (*e.g.*, vaso-motor derangements), by assuming that the occurrence of such disturbance prepares the soil for the growth of the micrococcus. Holding such views, he advocates, and has had good results from, epilation and the use of corrosive sublimate; and also urges the importance of cleanliness in the use of brushes, &c., as a prophylactic measure. (*Lancet*, March 28, 1885.)

Small-pox by Correspondence.—A curious but important case, in which small-pox infection was conveyed in a letter, is recorded by Mr. Karkeek, in his recent report on the sanitary condition of St. Marychurch. On March 1st, last year, a case of small-pox was reported to him in the person of a domestic servant, who had seen no one ill or recovering from small-pox, and who had not been out of the town for months. Moreover, no case of the disease had occurred in St. Marychurch or Torquay for years. On enquiry, it was found that the infected person had received letters from her sister, an inmate of the West Bromwich Small-pox Hospital, "who had unfortunately sent the germ of the disease in her letter." The case was at once removed to the Torquay Sanitarium, and the only person in the household who became ill was the recipient and reader of the letters. (*Brit. Med. Journ.* March 28, 1885.)

Dermatitis from Bichromate of Potassium.—Dr. B. W. Richardson says that while the skin, in its normal state, the epidermis being intact, is insensible to the action of bichromate of potassium; if it be torn or abraded, however triflingly, by the prick of a pin for example, a sharp pain is felt on the exposure; and if the salt be left in contact with the wound the caustic character of the salt is brought out intensely, the cutaneous tissue is decomposed, and violent inflammation is established. These symptoms are accompanied with intense pain, especially in winter when the cold is severe. The action of the salt does not cease until the cauterisation has penetrated to the bone. Workmen in factories are apt to suffer from ulcerations about the genitalia and elsewhere, resembling syphilitic manifestations. Such are the symptoms noted by French observers. Richardson himself reports several cases in which an acute dermatitis followed the exposure to watery solutions of the bichromate of not more than five or six per cent. strength. Workmen in chemical factories and autotype artists are most apt to be affected. The nasal mucous membrane may also be ulcerated. (*The Asclepiad*, October, 1884.)

After-treatment of Vaccine-Vesicles.—Dr. F. P. Atkinson suggests the following directions to be given after each case of vaccination. (1) If the arm become red and inflamed, apply powdered oxide of zinc, starch, or flour. (2) Never apply moisture of any kind, whether in the shape of a poultice or cold compress, as it tends to convert the vesicles into open sores. (3) Never apply oil to prevent the clothes from sticking to the arm, as it will do nothing of the kind. If the scabs be rubbed off and the marks be deep and not inclined to heal, it is best to apply some small pieces of lint (of just the size of the sore) soaked in dilute nitric acid lotion (seven minims to the ounce), and to keep them covered with oiled silk. (*Brit. Med. Journ.* Nov. 1884.)

Carbolic Acid in Indigestion.—Mr. J. F. Dixon of Bournemouth writes: In reading Dr. Lauder Brunton's lectures in the *British Medical Journal*, on indigestion, I have been particularly struck with his remarks on a form of hyperæsthetic pyrosis, or, if I may venture to coin a phrase, subjective acidity. I would presume, in this connexion, to call attention to the results of the administration of carbolic acid. I have for a long time particularly noticed its sedative, anæsthetic, and curative action on the mucous membrane of the eye; and, by analogy, I was some time ago tempted to try it in indigestion, associated with tenderness of the stomach, acidity, and flatulence. In most instances the result was very striking; cases which had proved very intractable yielding immediately to its influence. I used it of the same strength which I have always used for the eye, that is, two minims to the ounce of water, usually with the addition of five grains of carbonate of sodium, and twenty-five minims of aromatic spirit of ammonia. I have also found it very useful in the dyspepsia of tea-bibbers. If any one should be induced to act on this hint, I should be glad to hear the result. (*Brit. Med. Journ.* March 7, 1885.)

Mr. Edward Berdoe writes: I have lately treated several cases of indigestion with carbolic acid, and the results have in each instance been so fortunate that I am anxious to add the results of my experience to those of Mr. Dixon. I have found it most useful in that form of dyspepsia known as fermentative, accompanied by constant sour risings and eructations of gas, with pain after meals, and discomfort even after drinking milk or cocoa. My attention was first directed to it by Dr. Fenwick, who gave the glycerine of carbolic acid (1 part of crystallised carbolic acid to 4 parts of glycerine). The dose is from five to ten minims in mint-water or other convenient vehicle. As it mixes well, I think it a more safe and elegant form than a solution of the acid in water only. When there is much pain of the stomach after food, I have found it useful to add five or six minims of the liquor opii sedativus to each dose; and, when there is want of tone in the seat of digestion, and bad appetite, five to ten minims of the tincture of nux vomica will often be found serviceable. I have found these remedies also very valuable in the above combination in cases of pyrosis, where, I think, the sedative influence of the carbolic acid on the mucous membrane is far more useful than the bismuth one usually given in such cases. It is an interesting subject of enquiry whether the carbolic acid acts by arresting fermentative changes in the stomach, or by its well-known anæsthetic influence on mucous membranes. I have long given one-grain pills of this remedy in cases of vomiting from various causes, and have rarely found it fail to arrest it. In some of these cases there was no fermentative condition of the contents of the stomach; some of them were cases of reflex vomiting; yet all were, with few exceptions, greatly benefited. It would be desirable that the subject should be still further discussed by those who have had experience of the drug. (*Brit. Med. Journ.* March 21, 1885.)

Addison's Disease.—The typical picture of this disease is composed, as is well known, of three chief groups of symptoms:—(1) Anæmia and asthenia; (2) dark discoloration of the skin; and (3) disorder of the digestive apparatus. Professor Nothnagel considers the second symptom as the first in importance, the asthenia occupying the second place, while he regards the anæmia as of much less moment. According to numerous histological researches the discoloration is caused by an intense pigmentation of the deepest layers of the rete Malpighii. Several years ago Dr. Ehrmann of Vienna proved that in the amphibia the pigment does not originate in the epidermal cells, but in those of the cutis; he and Dr. Riehl stated also that the hair derives its pigment from the cutis. Virchow, too, some years ago found in cases of Addison's disease pigment cells not only in the deepest layers of the rete Malpighii, but also in the uppermost layers of the cutis—namely, along the nerves and vessels. Nothnagel likewise observed numerous pigmented cells in the uppermost layers of the corium of the skin of negroes. From these facts he concludes that the pigment does not originate in the deepest layers of the rete Malpighii, but is carried into the epidermis by the pigment cells. According to his views the pigment owes its origin to the blood, from which it issues already dissolved, a process which resembles the pigmentation noticed by a French observer in connexion with the spawn of frogs. Like the majority of enquirers, Professor Nothnagel supposes that it is probably due to an affection of the large nervous apparatus of the sympathetic. Also in cases of other diseases a pathological pigmentation is caused by affections of the retro-peritoneal region. Contrary to the statements of Jürgensen, in the last observed case of Addison's disease, the medullaiy, as well as the nonmedullary, fibres of the splanchnics were unaltered. The patient died, as usual, comatose. In the urine much acetone was found. Nothnagel expressed an opinion that the coma is probably caused by acetonuria, and not exclusively by anæmia of the brain. (*Lancet*, March 28, 1885.)

At the meeting of the Berlin Medical Society on the 25th ult., Dr. Jürgens showed specimens obtained from two cases of Addison's disease. One exhibited the typical characters of the adrenal affection, together with caseous bronchopneumonia; the other was a case which had been under observation for some time, presenting the clinical symptoms of morbus Addisonii; but it was a case in which a large aneurysm of the abdominal aorta had compressed the splanchnic nerves. The statement was made that in all cases of Addison's disease these nerves are in a state of grey degeneration, and that cases in which the adrenals are diseased, without any discoloration of the skin or other clinical symptoms of Addison's disease, these nerves are not involved. (*Deutsch. med. Woch.*, March 5, 1885.)

The Surgical Treatment of Varicocele.—At a recent meeting of the Academy of Medicine, Dr. Horteloup, Surgeon to the Hôpital du Midi, read a note on the Surgical Treatment of Varicocele, wherein he proposed a radical cure for that troublesome affection. Dr. Horteloup stated that, although he was aware that after the age of thirty the malady gradually disappeared spontaneously, yet he thought something should be done to render life supportable, even if the malady could not be cured before that age. This is all the more desirable in the cases of young men who present themselves for enlistment in the army, several of whom are annually rejected on account of the infirmity. Various methods of cure have been employed by surgeons, but they have proved merely palliative, and very frequently patients were sent away with only a suspensory bandage, which they had to wear for an indefinite time. In other cases, when operative measures were adopted, several fatal accidents have occurred, which have caused some repugnance to surgical interference. Dr. Horteloup, however, considers that since the application of the antiseptic treatment of wounds, &c., the opinions of surgeons have been considerably modified as to the result of surgical operations, and he did not see why a patient suffering from the affection in question should be denied the benefits of an operation. That proposed by Dr. Horteloup consists simply in cutting out a rather large portion of the scrotum on each side, thus reducing it to a size that would enable it to form sufficient support to the testicle and the spermatic cord Dr. Horteloup has performed this operation eighteen times within the last two years, and he found that, the size of the scrotum having been reduced, the suspensory bandage could be advantageously dispensed with. (*Lancet*, March 14, 1885.)

Cocaine in Burns.—Dr. Weiss writes: On December 25th, I was called to Professor L——. An atomiser which he was using had exploded, the hot steam badly scalding the Professor's lips, nose, eyelids, cheeks, and forehead. Pain was so intense that I apprehended general convulsions. I sent for sundry topical remedies, amongst them a two-per-cent. solution of hydrochlorate of cocaine. In the meanwhile I covered the injured parts with pieces of cloth dipped in olive oil; on the top of these I applied ice-water compresses, renewing them every minute, without affording the slightest relief. When the medicaments arrived, I touched the injured parts with a hair-pencil dipped in the cocaine solution. I had scarcely finished when all pain had entirely vanished, without any return. At my visit in the evening I found the patient quite easy and in good spirits. (*Wiener med. Woch.* Jan. 8, 1885.)

General Effects of Cocaine.—In a lecture delivered recently Dr. S. Freud described some experiments he had made to illustrate the stimulating and restorative power exerted by the muriate of cocaine. The exhilarating effect of the ingestion of from 0·05 to 0·10 gramme of the drug lasts four or five hours and disappears by degrees without being followed by depression· This effect of cocaine can be tested by the dynamometer. Under the influence of 0·10 gramme of cocaine an increase of power of pressure of the right hand of 2 to 4 kilogrammes, and of that of both hands of 3 to 6 kilogrammes, has been registered. This effect ensues shortly after the taking of the drug, and is best shown if it is taken while the system is in a condition of great depression. The daily fluctuation of the muscular strength which takes place in correspondence with the daily fluctuation of the bodily temperature, as shown by Dr. Max Bruch, is also to be taken into account in studying the effecting of cocaine on the motor power. (*Lancet*, April, 4, 1885.)

Cocaine as a Hæmostatic.—Dr. W. F. Waugh records a case of purpura with repeated hæmorrhages from the lips and gums, in which the application of a 4 per cent. solution of hydrochlorate of cocaine proved eminently successful, after the failure of many other hæmostatics to arrest the bleeding. (*Philad. Medical Times*, Feb. 21, 1885.)

Cocaine in Cauterisation.—Drs. Randolph and Dixon state, that when a saturated solution of cocaine in strong nitric acid is applied to the uninjured skin, the ultimate result is precisely that which would occur after the application of pure nitric acid, but the time required for the formation of a deep eschar is considerably longer in the former case. The sensation which follows cannot be accurately described as painful, a slight pricking only being felt shortly after the mixture is dropped on the skin. (*Philad. Medical News*, Jan. 24, 1885.)

Cocaine in Tinnitus Aurium.—Dr. H. G. Sherman, of Cleveland, Ohio, has successfully used cocaine as a local application for tinnitus aurium. A patient suffering from chronic otitis media, who had long been treated by all known methods, came to him suffering intensely with noises in the ears. A 4 per cent. solution of cocaine was instilled into the ear. Tinnitus and deafness were lessened. A second case was tried with similiar results. (*New. York. Med. Record*, Nov. 15, 1885.)

Hypodermic Injection of Cocaine.—M. Dujardin Beaumetz has been using with success hypodermic injections of cocaine in such minor surgical operations as the opening of an abscess. He insists upon the maintenance of the lying position on the part of the patient, injections in the standing or sitting position being usually followed by faintness. The dose injected by him has been 1ccm. of a solution of the strength of $\frac{1}{50}$th per cent., and the sedative action from this dose has usually been apparent in from five to ten minutes. (*Progrès Médical*, March 21, 1885.)

Oleate of Cocaine.—Dr. E. R. Squibb, of Brooklyn, in a recent communication, stated that the results of the application of the aqueous solution of cocaine to the skin for the purpose of producing local anæsthesia had proved very unfavourable. The chief difficulty in its successful application had appeared to be the difference between the epidermis and the epithelium of mucous membrane, and the impermeability of the former. Now, there was no possibility of finding a liquid which would pass the epidermis with the same rapidity that the watery solution passed the epithelium; but it had occurred to him that if a preparation could be made which would pass one seventh as fast, and if it were made seven times as strong, the conditions would seem to be met for making as successful applications of cocaine to the skin as to the mucous membrane, as at present practised. He next gave a *résumé* of the history of the preparations known as oleates and their various applications since they were first mentioned by John Marshall, F.R.S., in a lecture in 1872; at the end of which he said that ever since the discovery of the powerful anæsthetic action of cocaine on mucous membrane he had desired to make an oleate of the drug, but on account of its scarcity he had not been able to make any experiments with this in view until February 1st, 1885. He then gave an account of the various steps by which he had arrived at what he believed to be the best preparation for use, namely, one containing twenty-five per cent. of cocaine in an excess of oleic acid, which was just about seven times the strength of the ordinary four per cent. aqueous solution sold in the shops. It was a very expensive article, costing six dollars a fluid drachm; but there was no necessity for using more than a drop or two of it at a time. Next, having narrated a considerable number of experiments which he had performed for the purpose of testing the anæsthetic power of the oleate when applied to the skin, he stated that the conclusion thus reached was that the hope which had been entertained that cocaine employed in this way might prove a useful anæsthetic for the skin had been completely disappointed. Except for certain special applications, as, for instance, to the glans penis, anus, &c., and possibly for the relief of trigeminal neuralgia, in which it had not yet been tried, the oleate of cocaine had to be pronounced a useless preparation. (*Boston Med. and Surg. Journ.* March 12, 1885.)

Extracts from British and Foreign Journals.

A Method of averting Syncope.—Dr. W. J. Notley writes: In whatever way syncope may be produced, whether by an impression made primarily on the higher cerebral centres, or by influences carried along the peripheral nerves to these centres, and thence in both cases reflected to the heart and other organs of the body, there can be no doubt that the unconsciousness, either partial or complete, which forms the principal symptom of the condition is due to a deficient supply of blood to the brain. Cases of syncope may be divided into two classes: first, those which are due to some mechanical obstruction to the circulation arising in the heart itself, or in the great vessels springing from it, and secondly, those which are the result of various impressions made either on the peripheral nerves or on the emotional centres in the cerebrum. To the former class belong those cases of valvular and aortic disease which terminate in fatal syncope, as well as those in which, from the weakness of the circulation at the end of exhausting maladies, ante-mortem clots are formed, which, by interfering with the exit of the blood, terminate the life of the patient. In the other class of cases the cause is often external to the organism. A blow on the abdomen, by its effect on the mesenteric nerves, gives rise to an impression which, travelling along the spinal cord, reaches the medulla, and is thence transmitted along the vagi to the heart, resulting in a retardation or a complete stoppage of that organ. The same effect, it is well known, may arise from an impression made on the terminations of any of the afferent nerves, provided it be sufficiently strong to produce, not merely a sensation, but also a reflexion. In other cases belonging to the same class the impression is made primarily on the higher centres of the brain, and is in the nature of an emotion of joy or fear, or some other strong passion. From these centres, if the impression is strong enough, or if the nervous system is in that state of mobility allied to weakness, in which the liberating forces are in excess of the inhibiting ones, the impression is conducted to the medulla, and from it to the heart, along the same channels as those before named. Now, in all cases where the syncope is not complete, and where the heart continues to act, though feebly, measures are usually taken to restore the patient by adopting such means as are calculated to strengthen the action of the heart and facilitate the flow of blood to the brain. In many cases a person accustomed to faint from slight causes will be able to avert the syncope by adopting such means, and it is for this purpose that I wish to draw attention to the efficacy of heat applied to the head. In a person with a weak heart syncope may be produced by simply sitting with the feet in hot water, and, in like manner, it may be averted by the application of heat to the head. Any one may convince himself of this by first producing faintness in himself artificially. This may easily be done by getting into a bath of about 110° F. In a few minutes he will begin to feel faint. Let him then plunge the whole of his head except the nose and mouth beneath the surface of the water, and in less time than it has taken to bring on the faintness all the disagreeable sensations will cease, and he will now be able to continue in the bath, perhaps for half an hour longer, without any inconvenience. From this it would appear that the application of heat to the head is a measure of some value in averting a threatened attack of syncope. (*Lancet*, March 14, 1885.)

The Relation of Scrofula to Tubercle.—Some experiments with a view to elucidate this question have lately been performed by Arloing. He made use of tuberculous material from the lungs, and of scrofulous lymphatic glands. These materials were pounded up and filtered before use; and afterwards injected into rabbits and guinea-pigs, with the following results: (1) When injected into the subcutaneous tissue, lung tubercle produced visceral tuberculosis both in rabbits and guinea-pigs. (2) The fluid from scrofulous glands gave rise in guinea-pigs to scrofulous disease of the lymphatic glands. (3) The same material when injected into the peritoneal cavity produced in guinea-pigs visceral tuberculosis, but in rabbits had no effect whatever. From these experiments Arloing concludes either that the affections are nearly related to one another though dependent on different kinds of poisons, or else that they are due to one and the same poison, which varies in its effect according to the soil on which it falls. (*Centralblatt f. Chirurgie*, 1, 1885.)

Treatment of Scrofulous Neck.—Dr. Clifford Allbutt, in a recent lecture, affirms that the chronic enlargement of the glands of the neck, known as scrofulous neck, is secondary to irritation in the associated mucous membranes, and absorption therefrom; the chief of these being the mouth and throat, and the next in order the nasal, aural, and ocular surfaces; and sometimes from irritation upon the skin of the face and head. Speaking of the treatment of these cases, the author says that a residence at Margate, together with careful dieting and nursing, is the best means of cure in cases which are not far advanced. The cautious use of mercury, such as the solution of the bichloride, with tincture of iron, is very good, unless the inborn frailty be very marked; and iodides with iron are likewise valuable. External applications should be used with caution. So soon, however, as the glands become adherent, either to each other or to the surrounding tissues, then it is most desirable to call in the surgeon, and to extirpate every caseous gland or portion of a gland. Mr. Teale has devoted much time and has had great experience in operating on these cases, and it is due to the combined exertions of Dr. Allbutt and Mr. Teale that numerous cases have been restored from a state of misery to enjoy a life of comparatively good health. The scar remaining after the operation is small, and after a year or two not very noticeable, provided the drainage be not kept up too long; it is better to risk a second operation than to keep the drainage-tube in for too long a period. (*Med. Times*, Dec. 1884.)

The Surgery of Scrofulous Glands.—Mr. Pridgin Teale, in a valuable lecture on the surgery of scrofulous glands, gives the history of nineteen cases in which he operated with complete success. The lecturer points out how cases of scrofulous glands can be cured by making an incision over the diseased gland, and then scraping away the entire caseous mass by means of Lister's scraper. The wound is then thoroughly cleansed by carbolic acid solution 1 in 40, or by carbolised glycerine 1 in 10, and afterwards it is charged with iodoform. An india-rubber drainage-tube, reaching to the farthest recess of the wound, is inserted, and the edges of the wound are carefully brought together by fine catgut sutures; a pad of salicylic acid is placed over the wound; and, if the gland have been completely enucleated, the drainage-tube may be removed at the end of a week; but, if not, the rubber tube must be replaced by gilt wire, which should remain until there is reason to suppose that all is healed except the track of the tube. This period will vary from three to eight or ten weeks. The author illustrates by cases a most important point, which must always be very carefully looked to—viz., a case may present itself as a soft suppurating swelling behind the ear. This, however, does not heal if an incision be made into it, the reason being that the caseating gland, causing the abscess, is seated under the deep cervical fascia, and perhaps even under the edge of the sterno-mastoid. The opening must be carried right to the situation of the diseased gland, which must then be well scraped, and drained from the very bottom of the wound. The scar from this mode of operating is linear, and not unsightly, quite different from the puckered scar one sees in cases that have been left to get well by themselves. (*Med. Times*, Jan. 1885.)

Virchow on Croup and Diphtheria.—An address lately delivered by Professor Virchow before the *Berliner medicinische Gesellschaft* on the relations and distinctions existing between croup and diphtheria (*Berliner klinische Wochenschrift*, No. 8, 1885) is peculiarly interesting, both as an historical retrospect and as enunciating with great precision the author's views. He points out that as long ago as 1807 the opinion was held that laryngeal croup was caused by the outpouring of a coagulable substance over the surface of the affected mucous membrane. Bretonneau, whose name has always been associated with the first recognition of diphtheria, was only able to show that this coagulable fluid might also be poured out over the mucous membrane of the pharynx, and to this form of disease it was that he gave the new name. In 1847 Virchow himself classified three forms of superficial affections of these membranes as catarrh, croup and diphtheria. He described the latter at that time as "a mortifying process seated in the substance of the tissue itself, and not only a false membrane lying upon the surface. If a false membrane is found it consists of exfoliated parts of the surface itself, and hence there is a loss of substance beneath it." A diphtheritic membrane therefore covered an ulcerated surface. He regarded this fact as the real distinguishing feature of diphtheria. At the time of writing his paper in 1847, parasitic organisms were not recognised as such, but he had seen and described them as "granules," and did not believe that they had ever been observed in cases of simple membranous croup. They were rarely seen on the surface, as they rapidly made their way from without to the tissues within, sometimes giving rise to the excessive swelling and inflammation known as phlegmonous. Such a condition was always the result of an infection from without, and was not set up primarily by the blood. A fibrinous exudation upon a mucous surface was a totally different condition: it might give rise to the formation of casts even of extreme size, but still left no ulcerated surface beneath it when stripped off. At that time also he had expressed the opinion that there existed both a diphtheritic croup and a false-membranous croup, and at the present time, whilst willing to recognise subdivisions of these, he is as fully convinced that fibrinous exudations in the larynx and trachea are not by any means dependent in all cases upon diphtherial infection. He exhibited numerous specimens in illustration of his belief that a complete membranous croup might run its course without exhibiting any signs of diphtherial taint whatsoever, but it is evident that the diagnosis in these cases depended solely upon the superficial character of the membrane. He would refuse to recognise diphtheria in any case in which there was no loss of substance beneath the membrane. With respect to the occurrence of cases of diphtheria without any fibrinous exudation, he points out that in such instances there are often to be found small shreds projecting from the mucous membrane which look like false membrane, but are in reality portions of the mucous tissue itself. These have been seen in cases of small-pox, and have been erroneously asserted to be true variola pustules extending down the air-passages. Virchow maintains that pustules can never be developed in the trachea, the arrangement of the epithelium of the mucous membrane not being adapted for it. He would recognise a condition, however, of the simultaneous occurrence of a diphtheritic and a simple exudative process, although in his former work of many years ago he had denied that possibility; but he would still consider that the diphtheritic process in the pharynx runs its course more frequently without the formation of a false membrane than with it. On other mucous surfaces also, as in the uterus and the intestine, he has seen the diphtheritic process attacking the tissues so deeply as to set up peritonitis, and yet without the development of anything resembling a false membrane. In all cases in which a false membrane may occur in the air-passages the chief danger is presented by the obstruction which is produced, and in the case of simple fibrinous exudation the removal of the membrane is sufficient to give relief. The diphtheritic cases, however, are further complicated by the presence of an ulcerated surface under the membrane, and a special form of ulcerous diphtheritic laryngitis or tracheitis is one which has not been sufficiently recognised. Virchow expresses the wish that for the future the terms "croup" and "diphtheria" should be used with more discrimination than has been the case in times past. The former should be exclusively clinical in its application, as descriptive of a certain train of symptoms, the latter being used only to describe the conditions which may be set up in various parts of the body by the diphtheritic process. (*Medical Times*, March 21, 1885.)

Bloodless Stretching of Nerves.—Cattani has made several experiments on rabbits in Professor Tizzoni's laboratory, to see whether nerves can be stretched by forced extension of limbs, and to compare the results obtained in this way with the results obtained in the ordinary way by stretching the nerve on the fingers or on an instrument after it has been laid bare. The sciatic nerve of the rabbit was stretched by extending the leg on the thigh, and keeping the limb in this position while flexing the thigh until the foot touched the animal's neck. The histological changes following this procedure were identical with those following the ordinary method. In many nervous fibres, especially the large ones, the axis-cylinder was broken here and there at various distances; the medullary sheath showed spaces more or less extended, especially in the neighbourhood of Ranvier's nodes. To these first lesions succeeded degeneration, and disappearance of the medullary sheath and of the axis-cylinder, with increase of the protoplasm and with proliferation of the nuclei. Regeneration followed degeneration. A remarkable difference was observed, according to the mode of stretching employed. In the ordinary mode of stretching by laying bare the nerve, the effects were mostly confined to the point where the mechanical force was applied. In stretching by forced position of the limb, the degeneration was found to extend even to the peripheral branches. In this latter plan also, proliferation of connective tissue was absent; and hæmorrhage from rupture of small vessels was rare or absent. In both methods, the alteration in the function of the nerve consisted almost entirely in a considerable diminution of sensibility, motility being impared only slightly and for a short time. Stretching by forced position of the limb, when the nerve admits it, is to be advised when it is desired to affect the peripheral branches. (*Gazzetta degli Ospitali*, 4, 1885.)

Glycerinum Aluminis.—Mr. R. W. Parker suggests a new preparation of alum, which he can strongly recommend after a prolonged trial. It is made by dissolving one ounce of alum in five ounces of glycerine, by means of a gentle heat. This is about four times as strong as a saturated watery solution. It is indicated in all cases where a powerful local astringent is required; and has the advantage over tannin of being far less disagreeable, equally astringent, and quite compatible with an administration of iron. In cases of chronic pharyngitis—so common in children—it is very efficacious; diluted with water, it forms an useful gargle, injection, or lotion. (*Brit. Med. Journal*, Jan. 24, 1885.)

The Physiological Action of Hyoscine.—Dr. H. C. Wood of Philadelphia has recently published in the *Therapeutic Gazette* a series of observations on the physiological action of hyoscine. It has long been known from the researches of Ladenburg and others that henbane contains two active principles: amorphous hyoscyamine—which is quite distinct from true or crystalline hyoscyamine—and hyoscine, an alkaloid yielding crystallisable salts. Dr. Wood in his observations has employed the hydrobromate almost exclusively, but in a few cases he resorted to the hydriodate. He finds that frogs are sensibly affected by $\frac{1}{2000}$ of their weight of hyoscine, but that at least $\frac{1}{500}$ is necessary to produce a toxic action. The symptoms are very uniform. They consist of an increasing sluggishness, with a progressive loss of voluntary movement and a corresponding depression of the reflex activity, but without marked loss of sensibility. Death is brought about by failure of breathing, the heart beating for a considerable time after arrest of respiration. From this it would appear that in the case of the frog hyoscine acts as a motor-spinal depressant, killing by arresting respiration probably through a central influence. Any action that may be exerted upon the circulation is of a depressant character, but is so slight as to be of no importance. From a number of observations made on mice, cats, and other animals, it is seen that hyoscine acts upon mammals "chiefly as a spinal depressant; that it is a centric respiratory depressant, causing death by asphyxia; that it has very little effect on the circulation, what influence it exerts being in the normal animal set aside by the asphyxia it produces; that it does not paralyse the pneumo-gastrics; that in enormous doses it paralyses the vaso-motor system, and that on the heart itself its influence is very feebly depressant." Several experiments were made on the resident medical staff of the Philadelphia Hospital, and it was found that $\frac{1}{100}$ of a grain injected hypodermically always produced well-marked constitutional effects. The symptoms usually came on in about ten minutes, and consisted of dizziness, impairment of vision, dryness of the mouth, and an inability to walk straight. In some instances this was followed by deep sleep, lasting for many hours. Observations are being made on the clinical uses of hyoscine, and it is anticipated that valuable results will be obtained, especially in the treatment of certain forms of mania. (*Lancet*, March 21, 1885.)

Retardation of the Pulse in Mitral Insufficiency.—The outcome of a scientific interpretation of the signs yielded by mere auscultation of the heart alone appears to be that such signs are inadequate of themselves to establish the nature of the lesion on which the murmur depends. In making this statement, we would have it understood that we wish to regard the matter solely on its scientific basis. Dr. Keyt of Cincinnati has done much in the cause of scientific diagnosis of cardiac disease by his papers on the retardation of the pulse in valvular disease of the aortic and mitral orifices. He has found that abnormal retardation of the arterial pulse, and notably that of the carotid artery, is a real phenomenon of mitral insufficiency. It is present in all cases of pure organic mitral insufficiency, and is absent only in insignificant regurgitation or in regurgitation complicated by aortic insufficiency. The degree of retardation of the pulse is a measure of the amount of the regurgitation. The retardation may be present in two other organic conditions, and possibly in a third. In conjunction with an apex systolic murmur its presence is conclusive of mitral insufficiency. Compared with the apex systolic murmur, this sign is more positive, and distinguishes between harmful regurgitation and harmless conditions, which the latter does not. By the aid of the retardation of the pulse alone, a positive diagnosis may be made at once in any stage of the case under investigation, without waiting for the development of the usual sequelæ. Such are the conclusions at which Dr. Keyt has arrived. His evidence has been fully set forth in the *Journal of the American Medical Association* of Dec. 20th, 1884. The chief kinds of evidence adduced are the simultaneous tracings taken from the heart and the carotid artery of cases of pure mitral regurgitation, afterwards verified as such by post-mortem examination. For example, the normal interval between the time of the occurrence of the cardiac impulse and the pulse in the carotid, when the heart is beating 100 per minute, would be about one-seventeenth of a second. In the case of a boy aged nine having the signs of pure mitral regurgitation with a pulse rate of 100 per minute, the interval was found to be two-seventeenths of a second. The autopsy proved that the mitral regurgitant lesion was alone present. Dr. Keyt believes that he has also proved the point on an artificial schema of the circulation. The investigation is one which would well repay further attention. (*Lancet*, March 28, 1885.)

The Treatment of Onychia.—Dr. Charles W. Dulles, of Philadelphia, writes:—"Practice in the out-patient departments of two hospitals has brought to my notice a number of cases of this stubborn disorder, and has led to my adopting a method of treatment which is so satisfactory that I think it worth while to call attention to it. It is not new in principle, but I think the details of it are not to be certainly gathered from the suggestions which are to be found in some of the works on surgery. The plan I refer to consists in washing the usually stinking finger or toe-end with a weak solution of permangauate of potassium, trimming the nail back to where it is attached to the matrix, dusting on a *fine powder* of iodoform, and covering the whole in with turns of a narrow strip (not more than a quarter of an inch wide) of adhesive plaster. The plaster I prefer is the rubber adhesive plaster, which fits better, because it is softer than ordinary adhesive plaster, and is much easier to apply, because it requires neither heat nor moisture to fix it. By this means I have succeeded, so far in every instance, in getting rid of the pain, which is often excruciating; of the odour, which is almost intolerable; of the evidences of high inflammation, which are always present; and in securing a speedy recovery of what by other methods has proved an exceedingly intractable disorder. The secret of success, I believe, lies in attention to the details of this method. The finger or toe-end must be thoroughly cleansed with the permanganate solution; the nail must be gently, but thoroughly, trimmed back till all of it that is dead is removed; the iodoform must be *finely powdered;* the adhesive strip must be smoothly applied, and in such a way as to cover the whole of the end of the finger or toe. This latter step is accomplished by taking the thin strip of plaster, and applying it first on the proximal side of the nearest interphalangeal joint, *obliquely to the long axis of the finger or toe,* and carrying it up towards the end and round until it begins to return; by continuing these turns, the strip, with a little guidance, will gradually make first a latticed covering, and then cover up the interstices of this lattice, so as to make a complete cap. If necessary, a few strips may be applied directly over the end of the finger or toe, so as to fill up any gaps which would require too much plaster to be covered-in in the, so to speak, natural way. Such a dressing should be removed as soon as the pain or the stinking is renewed. But usually it will give immediate and entire relief from both; in which case, I think, it is advisable to remove it, at any rate in two or three days to see how the part is getting along. The second dressing, of the same kind, will often be applied to a healthy granulating surface, and form a dry, clean scab, under which the member will heal up perfectly. I have experimented in cases which were doing well under this treatment, and have found that the adhesive plaster part of it is indispensable. As soon as it was left off the cases did badly. Toes, I have found, are harder to cure than fingers, for obvious reasons. But in the case of both fingers and toes, I have seen children cease their complaints, resume their play, begin to get good sleep at night, and recover the appearances of health which pain had robbed them of. Finally, I would say that I think it important in these cases to see that the patient's bowels are once well cleared out, and then kept in good order, and to give a ferruginous tonic. (*Medical News,* March 21, 1885.)

Notes and Queries.

EUCALYPTUS OIL IN SEPTICÆMIA.—In connection with Mr. Kesteven's paper on the use of eucalyptus oil in fevers it may be interesting to note that Dr. Lauder Brunton mentions in his work on Pharmacology (pp. 86 and 841) that he has found it useful in septicæmia when quinine proved useless.

ADAMS'S POCKET MEMORANDA RELATING TO INFECTIOUS ZYMOTIC DISEASES. Messrs. Churchill have just issued (price 6*d.*) a folding card arranged by Mr. Matthew Algernon Adams F.R.C.S., containing, in an exceedingly compact and well-digested form, a number of particulars likely to be useful to practitioners in dealing with infectious diseases. It contains, for instance, a list of twenty-three questions, the answers to which will serve to determine the source of contagion; sixteen precautions for disinfection and isolation; and in a graphic and tabular form, the periods of latency, invasion, pyrexia, and infectiousness of eleven specific infectious fevers. It is admirably fitted to fill a place in the pocket-book, and we willingly bring it before our readers as a thing to be procured.

FRIEDRICHSHALL WATER.—There are fashions in medicines as in other things, and this water, which was formerly a favourite, seems likely to become so again, although it has been for some time thrown into the shade by other purgative waters containing much sulphate of magnesium and sodium. Frerichs, however, observed long ago that where it is desired to produce more or less fluid purging, the sulphate of magnesium bitter waters are of permanent usefulness, but that their continuous use is to be regarded with some distrust, inasmuch as the prolonged use of these waters is apt to affect the process of digestion. But when the water contains large quantities of sodium chloride in addition to the sulphates, as the Friedrichshall Water does, the chloride renders the effect milder and less exhausting, even after prolonged use, and consequently more permanent. Mosler and Von Mering by physiological experiments, and

Seegen and Sir Henry Thompson by prolonged clinical experience, have independently arrived at similar conclusions.

The therapeutic range of Friedrichshall is highly esteemed by the leading German physicians; Mosler and Thierfelder find it of great service in habitual constipation and various digestive liver affections; Scanzoni in the constipation of pregnant women; Schröder and Veit in uterine congestions and inflammation, and especially in chronic metritis; Weber in catarrh of the bladder; and Sir Henry Thompson in the prevention of calculous disease and the prophylactic treatment of gravel. Löschner, Helft, and Mosler speak highly of its use combined with suitable exercise and diet in the torpid forms of struma, and in scrofulous children. The opinion of these authorities is likely to give a turn to the fashion again and reinstate Friedrichshall as a favourite laxative.

VICTORIA WATER.—This is a newly-introduced alkaline table-water from Oberlahnstein, near Ems. It is pleasant to drink, and very moderate in price.

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⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BAILLIÈRE, of King William Street, Charing Cross.

Department of Public Health.

THE RESULTS OF THE NOTIFICATION OF INFECTIOUS DISEASES.

(*Continued from p.* 397.)

Llandudno (Carnarvonshire).—Population 4839 in 1881. Compulsory powers adopted in 1879. Notification is required by the medical attendant, and also by the occupier, whether a medical practitioner is in attendance or not. The diseases to be notified are: small-pox, scarlatina, diphtheria, typhus, enteric fever, and cholera.

According to the official return made to the Local Government Board in 1882, the clerk to the Llandudno urban authority expressed the opinion that the authority were "satisfied with the working of the provisions" of the Local Act, but he considered that the powers vested in them under Section 124 of the Public Health Act, 1875, as to compulsory removal to hospital were insufficient, especially in so far as the powers were limited by the words "and is without proper lodging and accommodation." With reference to this point, we observe that according to the Annual Report for 1880, Mr. Rees, the Medical Officer of Health, points to the absence of any isolation hospital, that in the next report a reference is made to a cottage at the gas-works which has been transformed into a temporary hospital, and that it was not until the Report for 1882 was written that even the "preliminaries for the construction of an isolation hospital on the most approved principles" were completed. The experience obtained in the district up to that date, on this question, has, therefore, no very great value.

There is considerable difficulty in determining with any degree of exactness the population of a sea-side resort such as Llandudno, but as far as can be gathered the under-named statistics give some indication of the amount of death in Llandudno during the two years before the Local Act was in full operation:—

Date.	Estimated Population.	General death-rate per 1,000.	Number of Deaths from			
			Small-pox	Scarlatina.	Diphtheria.	"Fever."
1878	4,760	18·5	—	3	1	—
1879	4,910	14·1	—	1	—	—

The Annual Report for 1880 gives the general mortality as 14·8 per 1,000; the zymotic deaths included scarlatina 3, diphtheria 1, and enteric fever 1. The report refers to certain importations of scarlet fever, but it makes absolutely no reference to the Act for the Compulsory Notification of Infectious Diseases.

According to the Report for 1881, the annual rate of mortality was 18·0, but if calculated on residents only 15·3 per thousand. As regards the notification clauses of the Improvement Act, Mr. H. Rees says:

> "The history of this district during the year presents a noteworthy example of the dangers to which greatly-frequented watering-places are subject from importation of infectious diseases during the season by visitors from infected houses or districts; but it also, fortunately, demonstrates the extent to which such dangers may be nullified by prompt and energetic action on the part of local authorities and their officials. The facilities for the instant detection of first cases, which have been conferred on Llandudno by the clauses that have been inserted in a Local Act, whereby it has become the duty of householders and medical men to give prompt notice of their existence, have proved to be of incalculable benefit; and it cannot be too widely known that the insertion of the said clauses was proposed by a medical gentleman in the district, and warmly approved of by his professional brethren. This Act has so far worked very smoothly, and without any of the inconveniences which have been anticipated by the opponents of similar legislation in other urban districts."

During 1881 the temporary hospital at the gas-works was utilised for some cases, but in other instances those whose relations were sick refused to sanction removal to the cottage in question, and other arrangements for isolation had, in consequence, to be made. The only death registered from either of the infectious fevers was one from scarlatina.

The general death-rate for 1882 was 14·2 per thousand, but that amongst residents only was only 12·0. The deaths during the year included two from scarlatina and two from enteric fever. Adverting to the system of notification in force the report states :

> "A considerable improvement in the health of the district, as evidenced by lower rates of mortality, was experienced during the year. The signal usefulness of the compulsory notification of infectious diseases has again been demonstrated by the number of cases it has brought to light, which would, in the absence of such an enactment, have almost certainly been allowed to form nuclei for the spread of fever. The temporary hospital at the gas-works has again been found exceedingly useful in isolating those cases for which no adequate accommodation for the purpose could be afforded at the houses in which they were seized, but it has long been fully recognised that it could only be regarded as a provisional and necessarily imperfect expedient. . . . There have been numerous invasions of scarlet fever into the district, but there were few, if any, instances in which any spread of the disease could be detected."

The Report for 1883[1] gives the general rate of mortality as 17·5, or, taking deaths amongst residents only, as 14·6 per thousand living. There were no deaths from any of the several infectious fevers. The only points in the report bearing upon the notification of infectious diseases are references to the speedy action taken directly such diseases came under notice, to the fact that the want of adequate means of isolation was severely felt during the year, and to the circumstance that the new hospital was completed, and would soon be available for use.

Macclesfield (Cheshire).—Population 37,514 in 1881. Compulsory powers adopted in 1882. The notification to be made by the medical practitioner in attendance, and also by the occupier, whether there is a medical attendant or not. The diseases to be notified are those referred to in the official circular of the Local Government Board.

The Annual Reports issued since the adoption of the powers in question contain hardly any reference to their working. The number of cases reported in 1883 are limited to one disease only, and then follows a statement to the effect that the compulsory notification has called attention to the existence of many cases of infectious disease which, under other circumstances, would have remained unknown, and has pointed out the impossibility of checking the prevalence of such disease unless proper means of isolation are provided. This matter had apparently been often brought under the consideration of the Sanitary Authority, but the town still remained without this needed means of defence against the propagation of infection.

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[1] See vol. xxxiii., p. 470

Manchester (Lancashire).—Population 341,414 in 1881. Compulsory powers were acquired in 1881, the notification to be made both by the medical practitioner and also by the occupier, whether a medical man is in attendance or not. The diseases to be notified are: small-pox, scarlatina, diphtheria, typhus, enteric fever, relapsing fever, puerperal fever, and cholera. Power is also given to the Corporation to extend the provisions to other diseases.

In the official return made to the Local Government Board in 1882, Mr. John Leigh, the Medical Officer of Health to the city of Manchester, states on the 5th of April that, so far, he was perfectly satisfied with the working of the Act. He continues:—

> "The medical practitioners of this city, as a rule, have readily complied with the requirements of the Act, and many of them have taken considerable trouble to furnish me with information respecting cases which they have been called in to attend. . . . As the Act was only brought into operation in Manchester on the 1st of February in the present year, I cannot give you any results extending over a long period; since February 1st, however, to Saturday last, 262 cases of infectious disease have been reported to me by the medical practitioners of the city, and 35 cases have come to my knowledge that were not certified."

The reports which we have received from Manchester do not contain much information bearing upon the influence of notification of infectious diseases. Manchester, however, makes large use of two infectious hospitals—namely, the Monsall Fever Hospital and the Pendlebury Hospital for Sick Children. Both hospitals are outside the city and, except in so far as the deaths occurring in them are specially referred to in the statistical portions of the Medical Officer of Health's report, the fatal attacks are not included in the ordinary mortality returns for Manchester.

Newcastle-on-Tyne (Northumberland).—Population 145,359 in 1881. The compulsory notification of infectious diseases came into operation under an Act passed in 1882. The notification is to be made both by the medical practitioner and also by the occupier, whether there is a medical attendant or not, and the diseases to be notified are those referred to in connexion with the Official Circular of the Local Government Board.

The Annual Report issued for 1883 by Mr. Henry E. Armstrong, Medical Officer of Health,[1] shows that whereas the mean rate of mortality from all causes per thousand living during the ten years 1873-82 had been 24·5, it was 25·4 in 1883. During the year 2,032 cases of infections disease had been notified under the Act, viz.:—

Disease.	Cases Notified.
Small-pox	493
Typhus	90
Enteric fever	216
Simple continued fever	45
Puerperal fever	7
Scarlet fever	1,152
Diphtheria	29
Total	2,032

The report then proceeds as follows:—

"The notification of infectious diseases has brought to the Health Department a large influx of work and additional responsibility. The investigation of, and dealing with, upwards of two thousand cases of disease in households of all classes, without giving offence to the householders, is a work necessitating a large amount of patience and discretion, which has not been wanting on the part of the special inspectors engaged on this important duty. So far as can be judged by a short experience it is believed that the 'Notification Clauses' of the Newcastle-upon-Tyne Improvement Act, 1882, are working, and likely to work, smoothly and with satisfaction to the inhabitants.

"On the receipt of every notification of a case of infectious disease the action taken by the Department is as follows:—

"(1.) A special inspector attends at the infected house without delay and makes a careful and exhaustive inquiry into the circumstances, filling up on a printed form details relating to all the probable channels by which infection may have been received or is likely to be propagated, the sanitary condition of the premises, water and milk supplies, &c. All defects noted receive attention.

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[1] See vol. xxxiii., p. 470.

"(2.) The removal to Hospital of suitable cases is recommended, and, where agreed to by those concerned, is effected. Printed advice and instructions as to the best means of preventing the spread of infection are left at the house in every instance, and, where requisite, disinfectants are supplied gratis.

"(3.) A printed form of certificate stating that the infected premises and articles are ready for final disinfection is also left with the householder for the signature of the Medical Attendant on the termination of the case. This certificate, when duly signed, is forwarded to the Medical Officer of Health, after which the Inspector sees to the final disinfection. After every case of fever or small-pox the bedding is removed to the Disinfecting Station, where it is purified and returned without charge to the owner.

"In the course of the inquiry referred to numerous illustrations of the various agencies by which infection is likely to be propagated have come under observation during the year, and in several instances the actual spread of disease has been traced to such causes. . . .

"The most striking fact disclosed in the Infectious Diseases Inquiry is the generally imperfect character of the separation made between the sick and the healthy. In even large private houses this separation consists for the most part merely of the removal of the patient to a room on the top story ; the doorway is hung with the much relied on 'carbolic sheet,' which, though useful whilst kept saturated with disinfectant and thoroughly closing the aperture, is not very efficacious when, as frequently happens, it is too small, or is allowed to get dry, or is hooked back, or when the mother of the patient, after being for a time at the sick bedside, goes to other parts of the house without change of dress ; or where the uninfected children are allowed to enter the sick-room. Sometimes the apparently healthy members of the infected household are sent away—say to the seaside—where some of them occasionally develope the disease latent at the time of their leaving home. The inconvenience of keeping up two establishments not unfrequently leads to the return home of the outsiders before infection is gone. In one family several children after having been sent to the seaside for a few weeks on account of Scarlet Fever at home, were brought back to Newcastle in order that they might attend school as usual, and an unoccupied house in the street next that in which their home stood was taken for them. It happened that the back doors of the two houses were near together and intercourse was kept up between the *disjecta membra* of the household, with, as might be expected, the result that before long they all became infected, fell ill, and had to be removed to the parental roof before the first case was recovered.

"If this holds in middle class houses, what is to be expected in tenement dwellings of one, two, or three rooms each, of which there are several on the same stair and scores in the same street. . . . . Two hospitals for infectious diseases have been provided in Newcastle, one for small-pox, and a second for the other specific fevers. The accommodation is, however, of a defective character, especially in so far as the various fevers are concerned, and as a consequence the Corporation are at present engaged in the erection of a new hospital which shall fully serve the numerous requirements of their district. Certain other improvements have also been determined on or already effected. In consideration of an annual sum paid to the Corporation by the Board of Guardians, all pauper cases of infectious disease are now admitted into the Corporation hospitals without further charge. A Washington Lyon's steam disinfector has supplemented the hot-air Ransome stove, on account of the large increase in the amount of disinfection which it has been found necessary to carry out since the compulsory notification of infectious diseases came into operation. A new and improved hospital ambulance has also been provided. During 1883 the following patients were admitted into the fever and small-pox hospitals :—

259	suffering from small-pox.
76	,, ,, typhus.
30	,, ,, enteric fever.
13	,, ,, scarlet-fever.
3	,, ,, simple continued fever.
1	,, ,, roseola.
2	,, ,, other diseases.
384	

Norwich (Norfolk).—Population 87,842 in 1881. Compulsory powers adopted in 1879. The notification is to be given first to the occupier by any medical practitioner in attendance, the occupier being responsible for its transmittance to the Sanitary authority; and second, by the occupier himself when there is no medical man in attendance. The diseases to be notified are: small-pox, scarlatina, diphtheria, typhus, enteric fever, relapsing fever, and cholera, and power is given to the Corporation to include other diseases.

The Annual Report for 1880 shows that whereas the mean death-rate from all causes for the four years 1876-79 had been 22·7 per thousand, the rate for 1880 had been 23·9; and during the same year the rate from the principal zymotic diseases was 5·4 per thousand. The deaths which had occurred in the city during 1880 included--scarlet fever, 187; diphtheria, 2; and "fever," 37. Dealing specially with the notification of infectious diseases Mr. Crosse says :—

> "The result of the first complete year during which this has been in operation, as provided by the City of Norwich Improvement Act of 1879, is as follows :—I have received 858 notices, of which 669 have been of scarlet fever, 180 of typhoid fever, and 9 of diphtheria. I believe that this represents tolerably accurately the extent to which these complaints have prevailed in the City. The medical men, as a rule, most cheerfully comply with the provisions of the Act, and the exceptions are too unimportant to deserve notice, whilst the omissions are so frequently made evident in the weekly returns of deaths as to supply all the necessary information. Through its operation much good has resulted, though not in the most important direction, as I shall explain further on; but impure and deficient water-supply, faulty drainage, foul bins, and other sanitary defects have been so abundantly brought immediately under notice as to repay most fully whatever cost it may have incurred. . . . The frequents visits to every part of the City which these notices necessitate, and the information appended to each, after each visit, of the water-supply, drainage, and condition of bins. . . . supply valuable infomation to the sanitary authority and has issued, up to the present, in substantial improvements.

> "*Iron Hospital*—Nine patients were admitted during the year, as against ten in the year preceding. All were cases of scarlet fever. . . . When one reflects upon the prevalence of this complaint throughout the City during the whole year, surprise must naturally arise at the small number who found their way into the Iron Hospital, especially as isolation alone is the remedy we possess to check the progress of the disease. How many of the 187 deaths might have been prevented had this method been more extensively adopted, it may now be futile to dwell upon. But it is worth while enquiring whether there is any cause that can be assigned for the dislike which exists, both on the part of the public and of the medical men, to avail themselves of the accommodation offered them by the sanitary authority at the Iron Hospital. The unpopularity that it enjoys, as far as I have been able to ascertain, is partly owing to the insufficient accommodation that it possesses, and partly to the want of proper superintendence and good nursing. Upon the latter points I have received many complaints from my medical brethren, and anybody can satisfy himself as to the former by a visit to the building. . . . . I must also refer to the very imperfect provision that now exists for disinfecting beds, blankets, clothes, linen, &c."

For the year 1881 the general death-rate was 19·2, and the zymotic rate was 1·7 per thousand, the deaths including scarlet fever, 64; diphtheria, 1; and "fever," 15. Five cases of scarlet fever and three of small-pox were admitted into the Iron Hospital, the insufficient accommodation in which was well illustrated during the year when it became necessary to admit a case of scarlet fever at the same time that the small-pox patients were in the hospital, complete isolation of the two diseases being found "impossible." The arrangements for disinfection are referred to in the Annual Report as still most unsatisfactory. As to the notification clauses, Mr. Crosse writes:—

> "*Notification of Infectious Diseases.*—I have received 403 notices during the past year, as against 858 in the year 1880. Of these, 340 were cases of scarlet fever, 50 of typhoid, 5 of diphtheria, and 8 of small-pox. The operation of this Act is most satisfactory and most useful, and well worth what it costs, supplying as it does early notice of all infectious complaints, and thereby enabling the Sanitary Authority to ascertain and remedy such defects in drainage and water-supply as may be present, besides giving attention to the all-important item of disinfection. It proved especially useful in the cases of small-pox, resulting in most of the cases in early removal to the Iron Hospital, and in the others to careful isolation at home. It followed, as a consequence, that the course of the complaint was very circumscribed, and very easily controlled."

During the year 1882 the general death-rate was 20·6, and the rate from the principal zymotic diseases 2·5 per thousand. The deaths included 6 from scarlet fever, 3 from diphtheria, and 8 from "fever." Five cases of scarlet fever and one of small-pox were admitted into the Isolation Hospital. No special reference is made in the report to the system of notification.

According to the report for 1883, the general and the zymotic rates of mortality were 19·6 and 1·1 per thousand respectively; the deaths including 3 from scarlet fever, 5 from diphtheria, and 11 from "fever." Only 99 notifications were made under the Special Act, 61 relating to scarlet fever, 34 to typhoid fever, and 4 to diphtheria. Seven cases, all scarlet fever, were admitted into the Isolation Hospital, which is still spoken of as being most unsatisfactory. No improvement appears to have been made as to the disinfection of infected articles.

The following statistics may be usefully placed on record as having a bearing on the question under consideration with reference to Norwich:—

RATES OF MORTALITY PER 1,000 LIVING.

Date.	General Mortality.	Mortality from seven principal zymotic diseases.
1876–79	22·7	?
1880	23·9	5·4
1881	19·2	1·7
1882	20·6	2·5
1883	19·6	1·1

Date.	SMALL-POX.		SCARLET FEVER.		DIPHTHERIA.		"FEVER."	
	Cases notified	Isolated in hospital.	Cases notified.	Isolated in hospital.	Cases notified.	Isolated in hospital.	Cases notified.	Isolated in hospital.
1880	—	—	669	9	9	—	180	—
1881	8	3	340	5	5	—	50	—
1882	1	1	117	5	1	—	47	—
1883	—	—	61	7	4	—	34	—

The very small amount of isolation in hospital carried out in Norwich is one of the most prominent points brought out in the annual reports. The same subject is adverted to at some length in Dr. Thorne Thorne's official report on Infectious Hospitals,[1] where it is shown by means of a table that whereas during the four years 1876-80 there were as many as 519 deaths registered from small-pox, scarlet fever, and "fever," yet only forty-one cases of these diseases were admitted into the Isolation Hospital. The report then proceeds:—

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[1] Supplement by the Medical Officer to the *Tenth Annual Report of the Local Government Board* [c.—3290.]

> "Since the specific infectious fevers are not admitted into the Norfolk and Norwich Hospital, and since the infectious wards at the workhouse had, up to the end of 1880, been used for the treatment of other cases than those fevers, the above table indicates the total isolation in hospital carried out in the urban sanitary district of Norwich, and it is evident that, apart from the occasional admission of such small-pox patients as have come under notice, the isolation effected has been so partial and trivial as not materially to have influenced the spread of infection throughout the borough.
>
> "This result is the more remarkable because under section 43 of the Norwich Improvement Act, 1879 (appended to Report), the Corporation acquired powers rendering compulsory the notification of certain specified infectious diseases occurring within their district, and that under that section as many as 669 cases of scarlet fever, 180 of 'fever,' and 9 of diphtheria were brought under their notice in 1880.
>
> "The more prominent of the grounds which appear to have led to this failure to stay the spread of infection by means of isolation are as follow:—In the first place, the hospital building is not properly adapted to the simultaneous isolation of cases of more than one disease, there is no proper accommodation for nurses, and it is structurally unfit for the reception of the sick in very cold weather. In the second place, it is locally known as the 'Small-pox Hospital,' and this has unquestionably acted as a deterrent to its use for other diseases. Thirdly, it is very generally believed by the medical profession of Norwich that the present care-taker and his wife are not suitable persons to have charge of the sick. In a report addressed to the Sanitary Authority in June 1880, Mr. T. W. Crosse, F.R.C.S., the City Medical Officer of Health, speaking of the hospital, says:—'At the present time, and under the present administration, there can be no doubt that the place is not doing the good that it ought, and that it is certainly capable of doing, and the sooner it is restored to the condition of efficiency it once enjoyed, the better will it be for the city. . . . .'
>
> "As the result of these circumstances medical men who, I am informed, would gladly send cases of infectious fevers into a properly constructed and properly administered hospital, now decline to take any such course, and it is possible that the Sanitary Authority themselves recognise some of the hindrances to isolation attendant on the existing arrangements, as they have never yet taken any action with a view to compelling the removal of a single patient to the building."

(*To be continued.*)

REPORT ON AN EPIDEMIC OF DYSENTERIC DIARRHŒA IN SETTLE AND GIGGLESWICK.

BY FRANCIS E. ATKINSON, L.R.C.P., M.R.C.S.

APPENDED to Mr. Atkinson's Annual Report on the rural sanitary district of Settle is an account of a remarkable epidemic of severe diarrhœa which occurred last autumn in the town of Settle and in the adjoining village of Giggleswick, and having regard to the desirability of placing on permanent record all precise information relating to the etiology of diarrhœa, we quote the greater part of the report in detail, omitting certain references to plans, maps, and meteorological and other tables with which the original document was accompanied.

The area of the Settle township is 4,490 acres, and its present population is about 2,145, living in 429 houses. Giggleswick township covers 4,338 acres, and has a population of some 636, living in 106 houses. After a preliminary description the report proceeds as follows:

"*Intimation of Outbreak.*—During my absence from home, on October 25th, I received intimation of an unusual prevalence of diarrhœa in Settle. I immediately returned home and commenced a house-to-house inquiry into the extent and origin of the epidemic. From the information collected, it appears that the actual outbreak, to which this report particularly refers, commenced on the 18th of October, and terminated on the 28th, during which eleven days there were no less than 180 cases. I have, however, embraced a longer period of time, viz. : from October 5th to November 5th, in order to show more distinctly the extent and limits of the epidemic.

"*Extent.*—During this period there were 218 cases in 120 houses having a population of 621. Of these, 188 occurred in Settle and 30 in Giggleswick.

"*Percentages to Population.*—The percentage of those attacked to the population of the houses visited by the disease was, in Settle, 37·9 ; in Giggleswick, 23·8—or a percentage of 8·7 and 4·7 to the entire population of Settle and Giggleswick respectively.

"*Previous Cases of Diarrhœa.*—Previous to this there had been a few cases of summer diarrhœa, chiefly about the latter end of August, but not amounting to any epidemic. It is curious to note that during the period of the present epidemic there were a few cases of an apparently similar nature (dysenteric in character) at Malham Tarn, a hamlet six miles N.E. from Settle, with a range of hills between ; but these had extended from the latter end of September, chiefly affecting children, and were probably bad cases of summer diarrhœa, unattended by any medical man. There was no connexion between these and the Settle cases, and in none of them were the symptoms so virulent in character.

"*History of Epidemic.*—On reference to the Disease-Chart for Settle (not reproduced) it will be seen that, whereas there were few cases, varying from 0 to 3 daily, between October 5th and October 18th, on that day the number suddenly increased to 9, and went on daily increasing until October 23rd, when the epidemic reached its height and there were 27 cases.

"On the 24th a sudden drop in the number of cases will be observed, and though the daily decrease was not uniform, we may consider that from this date the epidemic gradually declined until the 29th, when it practically ceased as suddenly as it had begun.

"A reference to the Disease-Chart B (not reproduced) shows a similar, though not so clearly marked, history in Giggleswick. Of the thirty cases recorded twenty-two occurred within the assigned limits.

"In warm weather, and at this period of the year, few communities are entirely free from diarrhœa and, in such an exceptionally hot and dry summer and autumn as we have just experienced, a prevalence of diarrhœa was to be expected; but, on reviewing the history of the present epidemic, it will be seen that something beyond the ordinary exciting causes of diarrhœa was at work apparently between the 17th and 29th of October to account for the sudden rise and fall in the number of cases, and for the marked change in the characteristics of the disease itself.

"*Character of Disease.*—The severity of the disease varied considerably from simple looseness of the bowels to dysenteric diarrhœa, with all its characteristic accompaniments. The attack was ushered in in many cases by a rigor more or less marked, with a temperature of 102° F. The patient complained of headache frequently above the eyes and nausea, with severe colicky pains in the lower part of the abdomen. These pains generally preceded by some hours the diarrhœa, which was in many cases accompanied by vomiting. In some cases the vomiting occurred only at the commencement of the illness; in others it lasted throughout the attack. The evacuations were watery and very offensive, and contained mucus and more or less blood, in many of the cases. In some instances shreds and even rings of mucous membrane were passed from the bowel. The tongue was furred and there was frequently great thirst. General aching of the limbs was often experienced, and in a few of the worst cases there were cramps in the limbs. These symptoms were followed by a sense of weakness and prostration, in two or three instances amounting to collapse, with blue lips and fingers. Delirium and obstinate hiccough occurred in a few of the worst cases.

"*Duration.*—The duration of the attack varied from a few hours in the mild cases to a fortnight in the severer ones.

"*Relapse.*—In several instances there was a relapse, taking place after three or four days' freedom from the disease, the relapse being as severe as the primary attack.

"*Fatality.*—Convalescence was slow and gradual. There was only one death and this was not directly attributable to the disease, as the woman was in a weak state of health and suffering from chronic bronchitic asthma.

"*Incidence of Disease.*—One of the peculiarities of the disease was its greater prevalence among adults than young children.

"*Age.*—Of the persons attacked it will be seen in the Table of Ages below, only thirty-six were children under five years of age, of which only six were infants under one year; as compared with 182 among persons over five years of age.

TABLE OF AGES.

Age.	Settle.	Giggleswick.	
Under 1	5	1	36 under 5 years.
1 to 3	14	2	
3 to 5	13	1	
5 to 15	31	5	182 over 5 years.
15 to 25	36	3	
25 to 60	72	11	
Over 60	17	7	
Total	188	30	218

"*School Attendance.*—I have examined the school registers and find that the epidemic did not in any marked degree affect the number of attendances.

"*Investigation.*—The symptoms above enumerated, being those of acute irritant poisoning, suggested to my mind at first the suspicion of dangerous adulteration of some common article of diet, and in my house-to-house visitation I enquired carefully into the consumption of the following articles of food.

"*Food.*—Milk, butter, cheese, tea, coffee, tinned and preserved meats, fresh meat, pork, sausages, ham, bacon, lard, fish (fresh, salted, cured, and shell-fish), fruit, vegetables, mushrooms.

"It was soon manifest, however, from the tabulated results that there was no evidence to show that any of these were to blame.

"I attempted to differentiate between the diet of those persons attacked by the disease and those who escaped, but without result.

"It appeared now that there were only two elements common for the most part to those attacked, whose contamination would be likely to cause so extensive an outbreak, viz.: air and water.

"*Air.*—At present I confine myself to the possible contamination of air by the escape of sewer gases into the houses. . . . .

"*Sewerage System.*—The private drainage connexions with the main sewers were made in 1879 under the superintendence of a clerk of private drainage works, appointed by the Sanitary Authority, and were carried out in accordance with regulations drawn up by Dr. Barry, then Medical Officer of Health. Since that time the same regulations have been in force with regard to all new buildings connected with the sewers. During the course of my inquiry I examined the private drainage of the premises where cases of the disease had occurred, and found the methods of disconnexion to be satisfactory and in only one instance was complaint made of any drain smell in the house.

"The main sewers constructed to carry sewage only are all laid in straight lines, and have inspection shafts at every change of direction or gradient. They are ventilated by means of gratings connected with the manholes at the level of the roads, and by shafts at one or two of the highest points in the system. They are flushed by Field's Self-Acting Flushing Tanks, placed at the heads of the main sewers in Settle and Giggleswick.

"The sewage is ultimately dealt with by irrigation. At the commencement of the epidemic the flushing tanks could not act as frequently as usual, on account of the scarcity of water. Complaints were, therefore, made of the smell issuing from the road ventilators, which were more offensive than usual. These, however, were only objectionable to occasional bystanders, as the smells emitted were rapidly diluted and diffused.

"The sewerage system is common to Settle, Giggleswick, Langcliffe and

Stackhouse, and it is interesting to note that at the time of the epidemic there were no cases in Langcliffe and Stackhouse.

"*Water Supply.*—The Settle Water Works were re-constructed by the Sanitary Authority in 1882, when they bought over the plant of the Settle Water Works Company, together with their water rights and the property known as the Dog Kennel Mill and Dam, which latter has been converted into a reservoir.

"S. J. Smith, Esq., C.E., held a Local Government Board Inquiry in February of that year, upon the plans prepared by Mr. Frith, and these were subsequently approved by the Local Government Board.

"It is a gravitation scheme, and the supply is a constant one, and supplies Settle and Giggleswick only. . . . . The chief supply is obtained from springs situate on the breast of a hill, in a pasture known as Scaleber. The water is collected by means of rubble drains into a receiving house. From this it is conveyed in a 6-inch pipe down the pasture, and across the road to another little covered house at the S.E. corner of the reservoir. Here it may either enter the reservoir or pass along a pipe at the side of the reservoir direct into the main to the town. Both receiving houses are provided with a by-wash for the overflow in wet weather. The reservoir measures 92 ft. × 34 ft., and has a capacity of 70,000 gallons. The sides are of brick and the bottom concreted, and the rose at the head of the main leaving for the town is situate in the middle of the W. side, at the height of 7 inches from the bottom. There is no filter. The reservoir is entirely uncovered and its surface is exposed to the air, and light and heat of the sun's rays.

"At the N.E. corner of the reservoir there is another inlet, provided with a disk, where a supplemental supply (for use in case of emergency), known as Barker's Beck, may at any time be admitted into the reservoir. . . . . This stream commences in high land at the corner of a field, where it receives the overflow from two cattle troughs (No. I. and II.), situate above, which are supplied from a spring higher up. It then runs open, skirting the side of the hill for some distance, and then is conveyed in a covered drain across a road to supply cattle trough No. III. in a field. From thence it passes open down the field to supply trough No. IV. in the next field. It next re-crosses the road open, and is covered down to the bottom of the field, where it is joined by another tributary.

"This small stream commences in some boggy ground in the field above on the breast of the hill.

"The two run for a short distance in an open ditch, from the end of which the water is piped across a small paddock to the side of the main road, where it is open as a drinking place for cattle. It is then covered in a rubble drain across the road, through a meadow where it supplies two troughs, and then passes to the N.E. corner of the reservoir, where it either can enter or be turned down the by-wash.

"A portion of the water works still remains to be described. . . . . . Twenty-nine houses, representing a population of 145, in the highest part of Settle, are situated at too high an elevation to be supplied from the reservoir. A main is therefore taken direct from the top receiving-house to supply these houses. . . .

"Above the point where the water from the springs is conveyed to the top receiving house it appears on the surface three times, as a supply to cattle troughs. Two of these openings are in an adjoining property, above that over which the Sanitary Authority has a right. The occasional stirring up of the sandy subsoil by the owner around one of these openings has produced a muddiness of the water in the reservoir, which, on account of the absence of a filter, has passed in the same condition into the town, and has been the cause of complaint.

"*Condition of Supply.*—In spite of the exceptionally low rainfall, and prolonged high temperature during the past summer and autumn, the water supply to the town has remained constant, and its use for domestic purposes been unrestricted, but, as I before remarked, it has been insufficient for the flushing of the sewers.

"On October 13th the water in the reservoir was at its lowest point, its depth above the rose being only 1¼ inches; and there was already a certain amount of vegetable growth at the bottom. On the 14th, as it was feared that the water would run short, the supply from Barker's Beck was turned in. This supply, as already stated, is only used in case of emergency. . . . .

"On examination of the course of Barker's Beck (already described), I found that there were large accumulations of cow-dung and other filth around troughs Nos. III. and IV., and to a less extent around troughs Nos. I. and II. where the animals had been accustomed to drink all through the summer; and the percolations from these would, of necessity, find their way into, and pollute the stream which was now turned into the reservoir. In a wet season the dilution of the water would probably have made it comparatively innocuous, but under existing circumstances the water must have contained both animal and vegetable organic matter in a concentrated form.

"This, added to the existing vegetable contamination of the water in the reservoir, amounted to a gross pollution of the public supply, and afforded reason for suspicion that here was the original cause of the epidemic.

"On October 24th the reservoir was turned off from the town, the supply being delivered straight from the receiving house down the side main, and a sample of water was collected. . . . . during my absence, and forwarded to the County Analyst for analysis

"His report was favourable, and a copy of his analysis is appended.

"The reservoir was cleaned out on the 28th and four barrow loads of slimy green vegetable matter were removed.

"Two months had elapsed since the reservoir was last cleaned.

"*Distribution of Disease.*—Reference is next made to certain maps of Settle and Giggleswick respectively, which show the distribution of the disease, and the number of cases in each house. The houses where the public supply is used are differently coloured to those which obtain their supply from other sources. The report then proceeds:—

"It will be noticed that of the total 218 cases, no less than 199 occurred in houses using the public supply, while only 19 cases occurred in 12 houses using other supplies. . . . .

TABLE SHOWING NUMBER OF *HOUSES* ATTACKED AND SOURCE OF WATER-SUPPLY.

	Total Houses.	Public Supply in use.	Houses having cases.	Other Supplies in use.	Houses having cases.
Settle	429	363	90	66	10
Giggleswick. . .	106	94	18	12	2
Total	...	...	108	...	12

"*Connexion between Water Supply and Disease.*—We are now in a position to consider what connexion may be traced between the condition of the water supply and the history of the epidemic.

"1st. It has been shown that the reservoir at the time of the outbreak was in an unwholesome condition.

"2nd. The coincidence of the dates affords the most striking proof of the connexion between the water-supply and the epidemic.

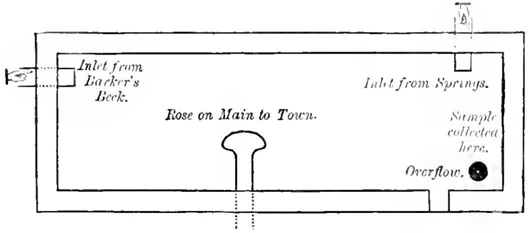
"Barker's Beck, a stream polluted with animal filth (as has been already shown), was turned into the reservoir on October 14th. The use of this water seemed to produce no evil result until October 18th, thus allowing 4 days as the period of incubation. Assuming this as the incubation-period, it is interesting to observe that after the 4th day (October 28th), from the turning off of the water in the reservoir from the town on the 24th, the epidemic ceased. . . . .

"3rd. Further confirmatory evidence is derived from the fact that in the area supplied from the top receiving house to the 29 houses (*i.e.* those at too high an elevation to be supplied from the reservoir), there were no cases.

"4th. Again at Giggleswick Grammar School (a resident community of about 180 persons), which has a separate source of supply, there was no sign of the disease, and generally speaking in those houses in Settle and Giggleswick which made use of private supplies of water there was no diarrhœa. I have stated in a previous part of this report that in 19 instances cases of diarrhœa occurred in 12 houses where the public supply was not used. Of these, upon investigation, 5 were found to be children who had drunk water from the public supply at school, 3 were adults who had been working at or visiting in other houses where the public supply was in use, and in these there was evidence that they had taken it. In the 11 remaining cases there was no evidence that they had drunk the public supply.

"I do not think that this evidence against the public water supply is disproved by the favourable report upon it given by Mr. Allen. In the first place, only one sample was forwarded, and this was collected at a point in the reservoir directly opposite to where the water from the receiving house enters, and at the greatest distance from the point where Barker's Beck enters, at a time when the reservoir was quite full; and it is evident that the polluting matter would not be equally diffused throughout the water in the reservoir (see sketch below).

SURFACE SKETCH OF RESERVOIR.



"*Conclusion.*—From the above evidence, I think it will be clear, that the poison which produced the disease was contained in the water in the reservoir, and that this water was the vehicle through which the disease was distributed to those persons who were attacked. Persons who used the public supply taken from above this point escaped, as well as those using water supplies from other sources. In the only 11 instances of persons attacked who used other supplies, it is quite possible, and even probable, that they had at some time drunk of the public supply, and did not remember having done so.

"*Copy of Report.*—On a sample of Drinking Water received from Settle, on October 25th.

"*Physical Character.*—The sample was free from suspended matter, clear and colourless; taste, normal; smell, none.

"*On Analysis.*—The sample gave the following results :—

Total solid matter	15·26	grs. per gall.
Non-volatile matter	13·02	do.
Loss on ignition	2·24	do.

"Chlorine = 0·90 grs. per gall., equal to chloride of sodium 1·48 grs.

"Nitrogen existing as nitrates and nitrites, very slight trace.

"Lead and other poisonous metals, none. Total hardness = 11·5 degrees.

"The oxygen required by the changeable organic and other oxidisable matter amounted to ·096 parts per million of the water.

"*On Distillation.*—The sample yielded :—

"Free ammonia = 0·20 parts per million. Albuminoid ammonia = ·100 parts per million. These results uniformly correspond to those characteristic of a pure water. They afford no ground for suspicion of contamination by sewage or similar impurity.

(*Signed*), "ALFRED H. ALLEN, F.I.C., F.C.S.,
"Public Analyst for the West Riding of Yorkshire, North
Derbyshire, The Borough of Sheffield, &c."

No. 1, SURREY ST. SHEFFIELD,
Oct. 27th, 1884.

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